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THE
RUBBER AGE

VOL. XII. NOVEMBER 25, 1922 No. 4

SCIENTIFIC MANAGEMENT FOR RUBBER MANUFACTURERS

Controlling Labor Effort - X

By Alfred Baruch

Consulting Industrial Engineer, New York

THE rapid development of labor-saving machinery and the great increase in the speed and facilities for transportation have brought in their wake a number of problems in connection with labor. Where formerly a man had to spend years in learning a trade in order to qualify for a steady position a few months and in some cases a few weeks will suffice to give him the skill he needs to earn good wages. In the earlier days a man found a limited market for his labor. He had to stay around the industrial center in which he was born or to which he had migrated. Not more than two such migrations took place in a man's lifetime.

Now if a man hears of a sudden demand for labor in any region away from home all he has to do is to jump on a train and go there at a comparatively small expense to himself. Thus his market is much wider and, knowing this, he is in a position to demand better wages locally. Besides, whenever there is a great deal of production going on there are hardly enough men to go around. This naturally increases the demand for them and enables them to obtain wages that they could not possibly have commanded in former days unless they had the skill that comes with several years of apprenticeship.

LABOR TURNOVER THE BIG PROBLEM

The most serious labor question at present is that of turnover. The authorities have it that the average labor turnover in industry is about 100 per cent per annum. The writer has been in rubber factories where the turnover was that high every month, and in some special departments much higher. It would seem, therefore, that this problem is even more serious in the rubber industry than in many others. The causes for this are partly inherent in the nature of the work itself and partly due to the conditions that exist in all large industries.—ALFRED BARUCH

New Industries Sap Labor Supply

Another factor in the labor shortage that exists in this country is a great increase in the manufacture of products that we used to buy abroad or else did not need before their invention. The rubber industry furnishes a striking example of this fact. In twenty-five years it has risen from an unimportant place to the position of being among the first six industries of this country. Together with the agriculture, automobile, steel and motion-picture industries, it has made heavy drains on the labor supply of the country. In addition it has caused a general increase in the labor demand of other industries that serve it, such as coal mining and railroads. Before the war we were in the habit of filling our raw labor needs from the hordes of immigrants who came to this country. The war and, more recently, restrictive immigration have practically shut off this source of supply. This shortage will probably drive us to an even greater development of labor-saving devices and to a further reduction in the use of skilled labor.

These conditions will tend to intensify the problems now facing us with reference to labor. Therefore a consideration of these problems and of the means available for their solution is timely.

High Labor Turnover

The most serious labor question at present is that of turnover. The authorities have it that the average labor turnover in industry is about 100 per cent per annum. The writer has been in rubber factories where the turnover was that high every month, and in some special departments much higher. It would seem, therefore, that this problem is even more serious in the rubber industry than in many others. The causes for this are partly inherent in the nature of the work itself and partly due to the conditions that exist in all large industries.

Let us take up purely local causes first. The bulk of rubber products in this country are manufactured in a region that is in the heart of one of the largest agricultural areas in the world. Most of the labor is drawn from the surrounding farms which were undermanned before rubber production took this jump. As most of the immigrants remain along the coasts the farmers and the manufacturers get little relief from this source. Consequently they are compelled to compete against each other for such labor as is available. In the winter months the farm hands are readily available for work in the factories. In the summer they go to the highest bidder, and as a result both the farmer and the rubber manufacturer suffer.

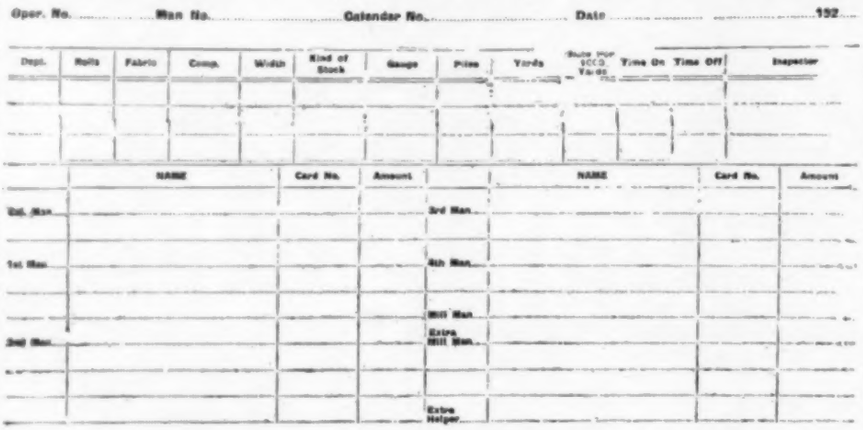
Rubber production is by its nature highly specialized. It requires heavy machinery to mill and calender rubber and, therefore, the only labor that is required is an attendant for each machine. The knowledge and skill necessary to operate these machines can be mastered in a comparatively short time. The same is true of the bulk of manual operations in rubber production. As long as experienced supervisors are at hand who are well acquainted with the unusual properties of rubber

and with the technique of rubber manufacture, a labor force of only a few months' experience will serve the purpose. As a result, men drift in and out of the industry very readily.

Another factor in the unusually high turnover of labor in rubber factories is the great massing of production in one region. This has the effect of putting the majority of rubber factories in active competition with each other for trained rubber labor. The result is that rubber workers are at a premium when production is steady. It is not out of the ordinary to hear that a certain rubber worker who was discharged from or left one factory in the morning had begun work in another by the afternoon.

These are the reasons for high labor turnover which are peculiar to the rubber industry. It does not, however, escape the causes that affect other industries. Kimball has divided them into two classes: those that are due to some lack or misfortune on the part of the employee and those that are due to some remissness on the part of the employer. He goes on to say: "On the part of the employee will be found incompetence, insubordination, drunkenness, laziness, and a general roving spirit which makes it difficult for him to stay in one place, and, lastly, those misfortunes over which the worker has little of no control, such as accidents, sickness, or death. On the part of the employer may be found such causes as low wages, bad working conditions, failure to protect the worker against accidents, a bad attitude on the part of the superintendents and foremen toward the employees, thus preventing the growth of interest and friendly feeling; unfairness in making promotions and inefficient management in general."

Needless to say, the cost of this high turnover is enormous. The shortage of labor and a general improvement in the humanitarian attitude of the management has led many rubber factories to establish a minimum wage to all workers in their employ. This is usually fixed at about $6 per day which means that the worker is being paid $6 a day while he is learning and until such time as he is capable of earning at least that much on a piece rate basis. In addition to this, there is the money that must be paid for his instruction, the material that he spoils in practice, the cost of operating the machines on which he learns, and the general overhead cost that is incurred by every producer.



FORM OF REPORT THAT COMPACTLY AND CONVENIENTLY RECORDS THE WORK OF EACH MAN AT THE MACHINES

It is difficult to estimate accurately what the cost of hiring and training a man is, but from the above it may be seen that a considerable expense is involved. If a factory has to train only 100 new men each year and the cost for each man is $100 (a conservative estimate) the expense of hiring and training men is $10,000 per annum. Even if it is possible to get experienced help the specifications for the work and the methods of performing it differ from one factory to another and it is absolutely necessary to give each man that comes in a certain amount of training.

Solutions of the Turnover Problem

The managers of rubber factories have attempted certain correctives of the turnover problem and their efforts have met with enough success to warrant a discussion of them. The next few paragraphs, therefore, will be devoted to an account of these methods.

The first principle of good management, as laid down by Taylor, is "Get the right man for the right job." This means proper employment methods. In order to secure the best results it is necessary to delegate the task of employment to one man who will be free to devote his entire time and attention to this function. This man must first find an adequate labor market from which he can draw his supply. From this market he must elect the men who are suited for his needs and come to terms with them regarding the wages they are to receive and the kind of work they are to do. He must also maintain proper records showing in brief the history of each individual while in the employ of the factory.

It is the function of the employment manager to supervise the administration of welfare work and all changes that have to do with the well-being of the worker. He must also be in close touch with any local method for training the worker to a position of greater responsibility and higher pay. In other words, the employment manager has become the connecting link between the owners and the men. In former days the owner of the shop hired his own men whom he knew personally in advance or by reputation, since the community was small and its character seldom changed. Now, however, the owner has lost all touch with his employees in any of the medium-sized and larger factories. The task of hiring the men has been delegated to a specialist along with other tasks. This man must provide the personal touch that existed in former days between employer and employee. He is the man to whom the workers should be able to go for redress of such personal grievances as they may have when they can get no satisfaction from their immediate superiors. In addition he must study the condition under which these men work and take active measures to secure the correction of the faulty ones.

The selection of workers to fit the needs of the plant has been developed to such a degree that it is rapidly approaching a scientific basis. Some personnel experts have even gone so far as to lay down definite rules by which a man's fitness for any type of work can be determined. These are largely based on certain facial characteristics, subject to various modifications. Where these methods have been applied, however, there has been nothing to show that the choices made were due to the expert's excellent appraisal of human nature rather than to any set formula or rule. Therefore it would seem advisable for the employment manager to follow the accepted methods for testing a man's skill and intelligence.

After a man has qualified on the basis of skill he should be sent to the house physician for a physical examination. This covers not only contagious or chronic diseases but the man's physical ability to do the work for which he was hired. There are types of work that require good eyes or good ears. There are other types where the individual worker's responsibility is great in that if he were suddenly incapacitated he might endanger the lives of his fellow workmen. The drivers of indoor tractors or the men who work in the cement house furnish a good example. It would never do to have a man who is subject to epileptic fits or to a sudden recurrence of an earlier ailment driving a motor tractor in a crowded aisle. The big railroad companies in hiring men who work on their trains exercise the greatest care in seeing that each man is not only physically fit at present but also that he does not possess a history of past ailments which might suddenly incapacitate him.

After a man has passed the experience and physical tests he must be put through a course of intensive training that will fit him for the work that he is expected to do. It has been found by actual experiment that men who were thought to be mediocre or poor workers develop great skill and speed under

the proper instruction. Even where workers have had previous experience it is often necessary to teach them the methods in use in this particular plant.

By the time a worker is ready for active production he has cost a considerable sum of money and his time becomes extremely valuable. It is therefore necessary to create conditions about him that will induce him to give his best efforts. This is impossible unless the material and equipment are under good control and he is constantly supplied with work to do. This part of the production scheme was discussed fully in the chapter on planning and dispatching.

In addition, the worker must be surrounded by conditions that make for sanitation and safety. The machines must be well guarded to avoid accidents. The light must be good and the temperature even. Provision must also be made for the worker's personal comfort. Unclean lavatories are often a source of great irritation and acute physical discomfort, besides being a fertile medium for the spread of disease. The questions of hygiene and welfare are so important that they will be taken up more fully in another chapter.

In attempting to solve the problem of turnover or at least to minimize its importance rubber manufacturers have undertaken many projects which ordinarily are outside the scope of an industrial enterprise. In order to permit a discussion of their respective merits they will be taken up in turn.

Inducements to Stay

The method of binding the worker permanently to the factory, which is most often used, is that of starting a building development on a site as close to the plant as possible. The houses on this development are reserved exclusively for the employees of the factory and are offered to them on easy terms of payment. The appeal of owning one's home is an old one and a man who is married and raising a family is usually won over by it. This does not, however, take care of the great mass of workers who toil in the factories in winter and on the farm in summer.

A second method, one which has not met with marked success so far, is that of selling shares of stock to the workers. The principle here is to make the workers partners in the business and enable them to share in the profits. No attempt is made to distinguish between employees who have been with the company for years and those who have been there but a short time. Nor is the quantity of shares that each worker is permitted to buy distributed on the basis of the value of the employee to the concern. Rather it is based on the individual worker's ability to save money, whether this comes from natural thriftiness or from a fortunate absence of responsibility.

A third method is the introduction of a savings and loan association which does a banking business on a small scale. This bank is intended to furnish the worker with a means by which he can borrow small sums of money to tide him over some period of stress or to enable him to buy furniture or even a house. The company uses the money thus collected as a loan on which it pays the current rate of interest. The worker becomes known to the bank or to the officers of the association and thus establishes a connection which proves valuable in time of need. He finds this extremely convenient and becomes reluctant to leave his present employment in search of better.

The fourth method is the opening of extension schools for workers to enable them to increase their personal fund of knowledge and to enable them to command higher wages because of the newly acquired increase in skill. This is an excellent opportunity for workers but they seldom avail themselves of it. It is the writer's opinion that work of this sort is beyond the scope of any single industrial enterprise. It is something that should be done by the entire group in a common body or else it is a task for the state to perform. Private enterprise in educational work is a serious undertaking. It means an investment from which there is only a distant return at best. The benefits to the worker are also doubtful, since a man who works at hard physical labor for eight hours a day or more is hardly in condition to undertake seriously the study of any involved subject.

Lastly, rubber manufacturers have undertaken to provide facilities for recreation as a means of binding the worker to the factory. In one case at least this particular form of investment ran into several millions of dollars. Gymnasiums, dance floors, theaters and club rooms were all furnished to the workers without cost. Many avail themselves of the opportunities thus offered with beneficial result in the rate of turnover, in consequence of this concession.

As a result of these activities on the part of manufacturers a noticeable reduction in the fluctuation of labor has been accomplished. None of these methods, however, has proved as effective as those which fundamentally affect the worker's status. The first of these is the satisfactory solution of all matters which relate to wage payment. The second is the creation of conditions of work that enable the employee to give his best effort without strain and without discomfort. The chapter on planning and dispatching indicated what might be done with correct scheduling of the movement of material and the operation of the machines. The remaining paragraphs of this article will be devoted to the development of a method by which the material, the machines and the men can be coordinated.

Labor Records

The control of labor effort is brought about by the issue of proper forms which will collect the information desired. Labor records have two important functions: the first is to instruct the worker on what he is to do and to obtain a statement from him or from the dispatcher of what the man has accomplished. The second purpose of labor records is to establish the cost of production. The mechanism that is devised to secure the information on operation must have these two functions in view. The chief difficulty with obtaining sufficient information from labor forms is the multiplicity of details that they involve. It is therefore advisable to consider any means that would reduce or eliminate the number of labor forms that are used in rubber factories.

It is possible to register automatically the amount of time the men spend at their work by installing a time clock or any of the mechanical reporting devices now in use. Where piece work methods of wage payment are in use the purpose of the mechanical time recorder is merely to testify that the man has been there on every day that his job requires him. Wherever the dispatcher issues the job cards he may have a small recording clock which indicates when the man started the job and when he finished.

Where the men work steadily at one operation all that is necessary is to make a record of the quantity of work that the man has done. This report must be divided according to the successive operations and must show a detailed list of the types of product that have passed through his machine. As most of the operations in a rubber factory are performed by more than one man, that is, the men are compelled to work in gangs, it is necessary to provide a report that will take care of all the men at one machine without causing unnecessary duplication in clerical effort. This can be done by putting the names of all the men at one machine on one sheet and distributing the individual amount to the separate records in the pay-roll book. The sub-foreman or gang boss is responsible for the accuracy of the individual report and, since most of them are exact duplications, there is little chance of any serious error.

By connecting time keeping with dispatching it is easy to establish complete harmony between the men, the material, and the machines. Whenever a job takes longer than usual the dispatcher by having all the information at hand can redistribute the work so that he may complete his schedule with a minimum of delay.

Where the operations are continuous and of the same character it may even be possible to let the job run on for a week before turning in a time report. This saves clerical effort and avoids a good deal of annoyance that comes with time keeping.

The oldest bit of rubber known is thought to be a shrunken, distorted ball found in 1909 in an excavation near Sasco, Arizona. It was taken, with some stone implements, from a prehistoric earthen jar uncovered at a depth of about three feet. It has a hard, cracked surface, incrusted with a buff-colored, plaster-like material, and when cut shows a block center of apparently good crude rubber.

New Applications of Rubber in the Form of Latex

Composition Tile and Slate -- Street Pavements and Road Making -- Sporting Fields -- Floor Coverings and Wall Board -- Acid-Proof Piping -- Latex Paint -- Many Other New Uses

By Ismar Ginsberg B.Sc., Chemical Engineer

IN the strenuous efforts that have been made for the past two or three years, ever since the price of rubber fell to the lowest limits, in the attempt to find new uses for rubber, attention was paid to the utilization of the rubber latex, as it comes from the rubber tree, as well as to the crude rubber obtained therefrom by coagulation, and the vulcanized product manufactured from the crude material. Accordingly, several new uses for rubber latex have been developed.

The use of the milky liquid for making rubberized paper is now well-known. The latex has been recommended for use in making paints, in the manufacture of various rubberized fabrics, and for many other purposes. It possesses certain advantageous properties which, while known, were not applied in any way up to the present time.

For example, in the manufacture of rubberized fabrics. When the rubber solution is applied in the usual process, the rubber does not have a chance to penetrate into the internal structure of the fibers, because of the large size of the particles in solution. But, in the original latex, these individual particles of potential rubber are so small that they can penetrate and fill up the innermost parts of the textile fibers, with the result that a very much better grade of rubberized product is finally obtained. The rubberized fabrics will last longer when made in this manner and the rubber will hold fast to the fiber much more strongly. This is just an example of the advantages of the use of the rubber latex for the same purpose for which the crude rubber itself could be used.

Not very long ago there was published a little item in certain English papers, indicating that a large shipment of rubber latex in drums in the condition in which it is taken from the rubber trees was being made to the United States. This would seem to indicate that the commercial aspect of the use of rubber latex for the manufacture of different articles is as well-established as the technical side of the problem. It certainly appears as if the search for new uses of rubber has opened up an entirely new field for large use of the rubber latex itself, a field which should expand and reach important dimensions in the near future. It is for this reason that the following description of some new uses for rubber latex, for which we are indebted in part to the French rubber journal, *Le Caoutchouc et Gutta Percha*, is of more than ordinary interest at the present time.

TAPPING TREES BY THE DOUBLE HERRINGBONE METHOD AND GATHERING LATEX IN CUPS ON A RUBBER PLANTATION IN THE FAR EAST

An important feature of the development of the use of rubber latex in the liquid form, as it comes from the rubber tree, is the fact that certain African and perhaps South American products are coagulated by very inefficient methods, compared with the process used on the plantations in Ceylon and elsewhere, where strict chemical control is exercised over the process. Consequently, in that case, that is where the efficiency of the manufacture of crude rubber from rubber latex is bad; at least in that case if not in the others where high efficiency is maintained, the latex instead of being coagulated on the spot may be mixed with a little ammonia to preserve it and shipped to European countries or the United States. Furthermore there does not seem to be any reason why plantation latex cannot be treated in the same manner, if the conditions are right for the use of the same, instead of the crude rubber. On arrival at the plant the latex can be incorporated with various materials and formed into various products of industrial and commercial importance.

A Rubber Gatherer Making a Rubber Sack by Covering Canvas with Pure Latex

Composition Tile and Slate for Buildings

The following are two compositions, which can be used to good advantage in the manufacture of composition tile and slate for building purposes.

	A	B
Latex	15	15
Sand	22	22
Kaolin	10	13
Chalk	10	—
Oxide of iron	—	7
Sulphur	2	2
Litharge	2	—
Lampblack	1	—
Lime	—	3
	62	62

In making gray and red compositions the content of rubber latex is reduced to 10 per cent. But, in spite of the rather proportion of the rubber latex in the mixture, each grain of the mineral matter is surrounded and enrobed with a film of rubber latex, which coagulates during the treatment that the mixture undergoes in the mixer. The paste is pressed into the form of slabs of a thickness of 3 to 5 millimeters. The slabs are then dried and vulcanized. It is advantageous to vulcanize the mixture to a certain extent while in the press, and then after the slabs are cut into form, to finish the vulcanization of the tile so as to obtain the desired details of the contour by conducting the process of vulcanization of the tile in the proper shaped mold. The slabs which are intended for manufacture into slate may be piled up in layers and placed in a steam jacketed vessel for vulcanization. A little talc is sprinkled over the slabs to prevent them from sticking together.

Bricks and Blocks for Street Pavements

Rubber latex can be used to make compositions which may be formed into particular shapes and sizes of blocks, which can then be used for pavements. Rubber waste is used in

Latex Gatherers on a Far Eastern Plantation Bringing in the Results of a Morning's Work for Preparation at the Factory

making the compositions and a large proportion of the same is generally employed for this purpose. There is no objection to the use of this material for the above purpose, but when it is used it is essential to see that the material is ground up very finely before being compounded with the other ingredients of the composition. The mixing of the ingredients must be carried out very carefully and thoroughly, so as to obtain a perfectly uniform and homogeneous product. A formula, which may be employed to make up such a composition to be used for making paving blocks, is given below.

Latex	27 parts.
Rubber waste powder	76 parts.
Sulphur	10 parts.
Litharge	2 parts.
Lime	2 parts.

The above composition is agitated very strongly in a press, which is steam-jacketed, so as to expel the water that is contained in the latex. The very thorough incorporation of the mixture also results in the agglomeration of the finely divided particles of rubber in the powder. The blocks or plates, when finished, should have the following dimensions, one meter wide, one meter long and 4 centimeters thick. After these plates are dry, it is expedient to place them on top of other plates, whose dimensions are one meter long, one meter wide and one centimeter thick, and which is made in accordance with the following formula:

Latex	56 to 60 parts.
Powdered large tires (waste)	30 parts.
Lampblack	30 parts.
Litharge	3 parts.
Sulphur	1.5 part.
Oxide of zinc	10 parts.
Carbonate of magnesia	5 parts.

The two plates are then pressed together again, then the composite plate is cut into the shape of blocks 25 centimeters long, 5 centimeters wide and 7 centimeters thick. Finally the blocks are molded in molds, which are made so as to give the proper shape to the finished product. This form of the finished block allows it to be placed in position without the necessity of cementing one block to the other, through a simple system of wedging the bases of the blocks. After the blocks have been subjected to the vulcanization process, they are ready to be laid on the street, which is preferably first coated with some asphalt. Various compositions of the above nature, but with some change in the nature and proportions of the ingredients, can be used to good advantage in the manufacture of all sorts of insulating materials and articles.

Race Courses, Courts for Football, Tennis, Croquet

Very excellent fields for all sorts of sports can be laid out with the aid of compositions, containing rubber latex. The latex is mixed with powdered waste of all sorts, and to this mixture there may be added such coloring matters as may be deemed desirable. The following formula can be used in making compositions, in which sand is the main ingredient, for the making of tennis courts and race courses:

Latex	30 parts.
Powdered waste	30 parts.
Sand	40 parts.
Chrome green	5 parts.
Chalk	15 parts.

The pasty mass, which is mixed together with the shovel, can be spread over the surface of the ground without any trouble and then smoothened out by means of a roller, which compresses the mass as well. There is no need of vulcanizing the mixture, for it is the powdered waste materials that afford the exposed surface of the applied composition its resistance

SCENE OUTSIDE OF A RUBBER PLANTATION FACTORY WHERE THE LATEX IS TREATED PREPARATORY TO PACKING AND SHIPPING IN THE FORM OF BALED SHEETS

to abrasion. It will be noticed that the composition contains only a small amount of rubber in the form of rubber latex, but this is no detriment, as only a small proportion of the rubber latex need be used in the mixture. If it is desired, after the composition has been applied to the ground, it may be vulcanized. When the proper substances are added to the composition before it is applied on the ground, that is substances which possess an accelerating power on the vulcanization of rubber, such as aniline, in conjunction with oxide of zinc and sulphur—any of the well-known accelerating chemicals may be used for this purpose, although very good results have been obtained with the use of aniline mixed with oxide of zinc and sulphur—then the rubbber composition will vulcanize in the cold without any difficulty. While such a proceedure has its advantageous points, it is by no means necessary to secure the desired results. The vulcanization merely functions to agglomerate the particles of the fine powder to one solid mass so that the surface of the same offers the proper resistance to wear and abrasion under foot. However, if the compression which is given to the surface of the composition is sufficiently great, which may be accomplished by rolling a heavy roller over the court, then it is not necessary to resort to vulcanization at all. For the high degree of compression holds together the individual particles of the mixture sufficiently well for all practical purposes.

Miscellaneous Uses for Rubber Latex

There are several other miscellaneous uses to which the rubber latex can be put. For example it may be used directly in the manufacture of linoleum. In this case it acts as a binding agent for the particles of solid matter, which is generally added to the linoleum composition. It is conceivable that its use for this purpose can supplant part if not all of the usual binding agent, linseed oil, which is commonly employed in the manufacture of linoleum. The price of the rubber latex in comparison with the price of linseed oil and the other drying oils, soya-bean, china wood oil, etc., that are also admixed with the linseed oil and used in the manufacture of linoleum, will be a determinant factor in the development of this application of rubber latex. It may also be mentioned that rubber latex can be used to good advantage as a binding agent in making all sorts of compositions, in which particles of solid must be held together by some strong agglomerating medium. For example, floor coverings, which are made from cork dust mixed with various filling and pigmenting materials, could be easily and economically made with the aid of rubber latex.

Waste Bark Utilization

The waste bark, obtained in paper plants, a product which is a big item in the manufacture of wood pulp and which is not used to any great extent for any purpose at all at the present time, may be made into floor coverings, composition board, etc. by the aid of rubber latex. Wherever it is desired to bind together solid particles to form a composite mass, which can be molded into form and once formed can be worked in various ways on the lathe and with machine tools, there will be found an important use for rubber latex. For it must be remembered that in every case it is possible to vulcanize the latex and convert it into hard rubber. There is then obtained the effect of an imbedding of solid particles of various substances in a background of hard rubber, there being a coating of hard rubber surrounding each particle and forming the union between it and the next. Such a product would naturally be very compact and solid, and from our knowledge of hard rubber, there is no doubt that it could be worked with machine tools and formed into any desirable shape. Furthermore, there is always present the additional advantage of being able to shape the object in whatever form is required by the use of molds, before the mass assumes a solid form. Then the molds are subjected to heat, the rubber latex vulcanized and a firm, solid mass is obtained.

Acid-Proof Piping

Rubber latex could be used as well in making casings for bottles, in the manufacture of piping for acid. In the latter case the well-known property of hard rubber in resisting the corrosive action of acids makes such piping very advantageous. Ordinary mineral matter, which is itself not attacked by acids, could be used as the body of the composition, while the rubber latex would serve to unite the individual particles of the mixture into one solid mass. The cost of such piping would not be great, and the process of manufacture would not be intricate or difficult. Any shape or size of pipe could be made, as the plastic mixture, made with the aid of the rubber latex, could be molded without any difficulty, and then vulcanized to give a solid mass. The jointing of such piping would similarly not offer any difficulty at all, for all that would be necessary to secure a tight joint, would be to use an ordinary rubber cement, which could be made from the same materials as were used for making the original mixture, with the addition of materials which would allow vulcanization of the rubber to be accomplished in the cold. Rubber cements, containing solvents, could be used for this purpose as well.

Acid Proof Apparatus

The making of acid-proof piping from compositions, containing rubber latex, opens up the possibility of making other apparatus, pots, kettles, pans, tanks, etc., which have to resist the action of acids. The ease with which the plastic mass, containing rubber latex and other materials, which would have to be carefully chosen in regard to their suitability for this purpose, that in so far as their acid resisting powers and mechanical strength are concerned, makes it possible to form the most complicated shapes from such compositions. Molds may be used for this purpose, and by the incorporation of the proper ingredients, the vulcanization of the rubber in the mixtures may be carried out either in the cold or at an elevated temperature. As the mineral matters, which can be applied to this purpose, are all very cheap, the commercial success of the undertaking would be determined to a large measure by the price which would have to be paid for the rubber latex. The products could be made in any color by the simple expedient of admixing the proper mineral pigment with the other ingredients of the composition. The mixing operation could be conducted on the floor with a shovel or else the regular type of mixing apparatus could be used.

Rubber Latex Paint and Protective Coatings

Rubber latex can also be used directly for sprinkling walls and other parts of building to protect the brick. As is well-known, vulcanized rubber either hard or soft is impervious to water. In fact it is one of the best, if not the best, waterproofing agents known. The use of latex as a paint for waterproofing porous structure, built of brick, wood, cement, stone, concrete, etc. is a very attractive idea. The liquid could be applied very easily with a brush or by means of a spraying machine, and if the proper materials were mixed with it, that is an accelerating substance, such as aniline, zinc oxide and sulphur, then the thin film of the rubber latex would vulcanize in the cold and form an impervious film, possessing very high qualities as a protective medium. Any color could be secured in the film by the incorporation with the rubber latex of the properly pigmented materials. The use of linseed oil would be superfluous, for the film would be produced by the vulcanization of the rubber latex, instead of by oxidation of the linseed oil. A comparison between the durability of the two films would undoubtedly indicate that the rubber film was far superior to the oil film, that it would last longer, that it would resist moisture and the wearing effects of the atmosphere better, and that it would produce all around more advantageous results than the oil film. Investigations still need to be undertaken to determine just what effects could be secured with rubber latex paint.

Road Making Direct with Rubber Latex

It has also been suggested that rubber latex be used directly in making roads. The under-surface of the road would be made from a mixture of rubber latex and sand, and on top of this there would be applied a composition, containing rubber latex, and finely ground old rubber tires of all sorts. This mixture would give a surface, which would be tough enough to stand up against the abrasion produced by the passing of vehicles of all kinds. The mixture would not need to be vulcanized and good results would be obtained if the proper care was taken to see that the thickness of the under-

layer was sufficient and that the rubber composition of which it was made contained the proper ingredients in the proper proportions.

The following formula gives the proportions of the ingredients in the composition used for making the underlayer. A very compact mass is obtained.

Latex	20 to 25 parts.
Sand	82 parts.
Powdered waste rubber	10 parts.
Sulphur	0.400 part.

The ingredients are mixed together rapidly, and then the pasty mass is spread over the surface of the ground, which has been brushed over carefully beforehand and given a coating of hot tar or asphalt. The thickness of the underlayer should be about 5 to 6 centimters, in order to obtain good results. Before going over the surface with a steam roller and while the rubber latex mass is still in the pasty condition, the mixture of rubber which is specially made to form the surface of the road is applied. This composition, which must resist the abrasive action of traffic, is made with a higher percentage of powdered waste rubber of the best quality. Usually ground up old rubber automobile tires are best suited for this purpose. The proportions of the different ingredients in this mixture are given below.

Rubber latex	30 to 40 parts.
Sand	20 parts.
Powdered rubber waste	65 parts.
Sulphur	1 part.

It is noticed that in addition to the powdered rubber waste the proportion of rubber latex and sulphur is also increased while that of the sand is greatly reduced.

After the surface composition is spread over the underlayer a steam roller is run over the road so as to press down the mass of materials and form a smooth, firm surface. A road, which is made in this manner, the particular details of the road-laying being varied to meet the varied conditions of traffic, will vulcanize in a few days in hot regions, if the mixture contains the proper accelerator. In European countries and this country as well, if this system of road making were adopted, it would be necessary to make the road in the summer time, in order that the gentle heating and vulcanization of the rubber composition in the sun should not be too prolonged. As soon as the surface is dry, the road can be opened up for traffic, as the small amount of vulcanized rubber serves simply to cement together the particles of sand and powdered rubber waste so as to form a solid homogeneous mass. It really takes several weeks of exposure to the hot sun before the surface is baked sufficiently and converted into a hard, perfectly non-dusting road, but it is not necessary to hold the road closed for this length of time for the traffic does not appear to disturb the natural course of the process.

Conclusions

It is hoped that this brief review of the new developments in the rubber industry, in which an entirely new field of manufacture appears to have been opened up in the utilization of rubber latex, will serve to point out the great possibilities existing therein. As has been mentioned, regular shipments of rubber latex are being made to this country from the Ceylon plantations. It is also reported that the latex is for use in making rubber paper. The price of the rubber latex, which contains it is understood about 30 per cent of solid rubber, has been fixed at about 60 to 75 cents the gallon, according to English reports. At that price it should be able to compete very handily with the more expensive linseed oil and other similar oils that are used as the binding agent in the manufacture of different compositions of matter. Hence, on the mere basis of cost alone, the use of rubber latex possesses an advantage, but when its use is considered from the standpoint of the technical advantages gained in the product made with it, then it will be evident that the rubber latex product is much superior to the regular product. For example, just in the case of linoleum and floor coverings made from cork, etc., it is clear that a linoleum or cork composition, in which the particles of cork or other ground up fillers and pigments are held together in a fast union by means of rubber vulcanized in the mass, will be more resistant to wear than when a film of oxidized linseed oil is the binding agent. All in all the future of this new development in the rubber industry appears to be very bright and replete with all sorts of possibilities. Not only is it likely to solve the problem of over-production of rubber, but it may open up such extensive fields for the use of rubber latex to make it necessary to increase the cultivation of rubber trees even over the high point that it has reached to this day.

Rubber Roads for Rubber Tires

New Type of Composition Paving Block Invented in England Said to be Noiseless and Strong Enough to Last Fifteen Years

A NEW type of rubber composition paving block has been produced by Wingate and Sutton, 5 Victoria Street, Westminster, London, S.W.1., according to a report to the Department of Commerce by Consul Coulter, London, which it is claimed by the manufacturers can be placed on the market at a price to compete with the ordinary creosoted wooden block, when the advantages of absence from noise and long life, estimated at 15 years, are taken into consideration.

Two types of blocks have been produced, a number one block, made of the "core" surfaced with a half inch hard vulcanized rubber, and a number two block, which consists of the "core" only. The principal ingredients of the core, which has been patented, are rubber, jute, and china clay. These ingredients enable the whole block to be vulcanized in one piece, and it has been found by experiment that the block should be a solid mass, and not made up of separate superimposed portions. Where the block has been hollowed out and filled with concrete or wood to reduce cost, it has been found that the rubber surface "creeps" and shows wear on the underside at the place of contact, and not on the surface.

In an experiment of a wooden block upon which a steel plate was placed as a seat for a rubber surface, it was found that the heavy traffic turned up the steel plates at the edges. At St. Pancras Railway station the covered way under the hotel is covered with a sheet of rubber of about one-half inch thickness. It has been found, it is claimed, that there is a tendency for the rubber sheet to "lick up" so that it must be pegged down from time to time. As a result of various experiments, Wingate and Sutton have decided that the separate solid block gives the best results. The block proposed is similar to the wooden block used ordinarily for street paving, and measures 9 inches by 4½ inches by 3 inches.

Up to the present time it has not been possible to manufacture rubber blocks at under three times the cost of wood paving which is about 25/- ($5.40) per square yard. The Gould block core it is claimed can be made at 2d per lb. and it is hoped the price of paving will not be more than £3 ($13.35) per superficial square yard.

Chinese Market for Motor Vehicles

ONE of the most promising tendencies in China is the attention now being given to road construction. It is not so long since motor traffic was impossible except in the main thoroughfares of the big ports; now roads are being planned in every direction, and, indeed, a complete network is likely to be in existence long before the railway program is realized. This attention to road development is having a stimulating effect on the motor vehicle trade, which so far has been chiefly to the advantage of the United States types. American cars are preferred to the British because they will pick up quickly on "top" gear, and have wire instead of artillery type wheels; also because American cars are said to be cheaper and are better packed. French, German, and Italian cars also score in regard to price.

Reading the Business Cycle

ONE of the most interesting discussions attending the Chattanooga advertising convention followed an address by J. Lee Allen, a real estate dealer of that city, in connection with which he presented the accompanying chart, says *Associated Advertising.*

He designed the chart, he explained, as a means for reading from time to time, the signs of the times. The sequence as indicated on the chart, he explained, was not of his own observation, but came from a close study of all the best authorities on the subject. He directed attention to the fallacy of superficial thinking in connection with making such estimates, and said that the course of business from the peak to the bottom was not steady and regular, for there are sure to be cycles in the main cycle.

Some one asked Mr. Allen for his opinion as to where business in the United States finds itself today, and he suggested that those present cast a secret ballot to obtain a consensus on the subject. Thirty-six of those present voted. Fourteen believed we were in either the sixth or seventh periods, while twenty-two wrote either eight or nine on the slips, fifteen selecting eight and seven voting for nine. Mr. Allen held the opinion we were just passing from the eighth to the ninth period.

The belief was expressed that the very rapid fall from the top to the bottom resulted from the fact that at the last peak business optimism had risen to an uncommonly high level in a short time, and that a rapid decline was the natural reaction.

Firestone's Book on Rubber

RUBBER: Its History and Development" is the title of a large, well printed, buckram-bound book of 146 pages published in September, 1922, by the Firestone Tire & Rubber Co., Firestone Park, Akron, Ohio. On the fly-leaf appears this explanation of the reason for issuing this elaborate volume:

"This book and the rubber exhibit accompanying it are the property of the Firestone Tire & Rubber Co. of Akron, Ohio. They are loaned to the Highway Education Board for the purpose of circulation among the various colleges and universities of the country with a view of giving an intimate picture of one of America's largest industries and also stimulating the interest of every college student in the good roads and highway transport movement."

The foreword is by Harvey S. Firestone, president of the company, who makes the interesting statement that the capacity of his factory when established twenty-two years ago was less than 100 tires a day. Today the plant can manufacture up to 36,000 automobile tire casings daily.

The book is divided into thirteen chapters which cover such subjects as discovery of rubber and growth of the industry, botanical facts and methods of preparation, varieties of rubber, history of tire development, distribution of rubber and long staple cotton, crude rubber at the source of supply, crude rubber at the factory, tire fabrics, component parts of a tire, tire building, vulcanization and factory equipment, inner tube manufacture, solid tire manufacture. Manufactured rubber goods other than tires and tubes are not mentioned and seem to be beyond the scope of this volume.

The full page reproductions of photographs, of which there are a number, add immensely to the interest and value of the book. These pictures are sufficiently large to afford the student of the subject a detailed view of many of the operations on the plantation and in the factory. The text is written in simple, clear, and easily understood language and the marginal sub-titles will be found helpful in reading or studying.

This handsome volume is certainly a credit to the Firestone company and a worthy addition to the literature of rubber. That it will be found an invaluable aid to the good roads movement there can be no possible question.

Statistics of Rubber and Textile Machinery

ACCORDING to the figures just issued by the Bureau of the Census, United States Department of Commerce, there were in 1919 seventy-one establishments in this country manufacturing rubber-working machinery as against only fourteen in 1914, and the value of their products rose from $2,725,807 in the latter year to $17,001,919 in 1919. This increase both in number of plants and value of their products was due largely to the expansion of the tire and tube manufacturing industry which required numerous mills, calenders, tire-building machines, etc.

Of the various states in which these rubber machinery manufacturers were operating in 1919 Ohio led with products valued at $5,898,439; New Jersey was second with $3,437,085; Connecticut a close third with $3,179,072; and Pennsylvania, Illinois, Massachusetts, and New York followed in the order named.

In 1919 there were twenty-five cotton gins in this country, with products valued at $10,175,936 and the same number of gins in 1914 produced cotton bales worth $4,901,680. Georgia and Alabama led other southern states in number of establishments and value of output.

For the first time the Census Bureau has issued separate statistics for textile machinery. In 1919 there were 432 plants engaged in the manufacture of textile machinery of all kinds, with capital invested of $129,797,903 and products valued at $122,089,264. The number of persons engaged was 36,126 of whom 31,823 were factory workers. Massachusetts led with 116 establishments whose output was valued at more than one-half of the total for the entire country, or $65,901,370. Rhode Island and Pennsylvania came next. What portion of these plants were engaged in producing machinery for cotton mills which make square woven and cord fabric for the tire industry is not stated. Fabric machinery was valued in 1919 at $29,865,051, and machinery for converting and finishing yarn and fabrics at $7,623,797. Machinery for working raw stock and preparing yarn for weaving, etc., was valued $35,529,666.

In the same year there were 403 plants turning out machine tools, with capital invested of $231,039,843 and value of products $212,400,158. Ohio led all the states with 102 establishments whose products were valued at $62,554,000.

A Method for the Measurement of Resistance to Tear in Vulcanized Rubber

Interesting and Instructive New Data and Formulae for the Rubber Technologist

By Erle C. Zimmerman

Research Laboratories, Firestone Tire & Rubber Company, Akron, Ohio

A GREAT many rubber technologists have noticed differences in tearing properties of various samples of vulcanized rubber. This property has been referred to as "fiber," "resistance to tearing," "grain," and by other local terms, all meaning about the same thing. The test was usually made qualitatively by cutting a short distance in the rubber and then tearing by hand. It was quite easy to distinguish between different compounds and different cures on the same

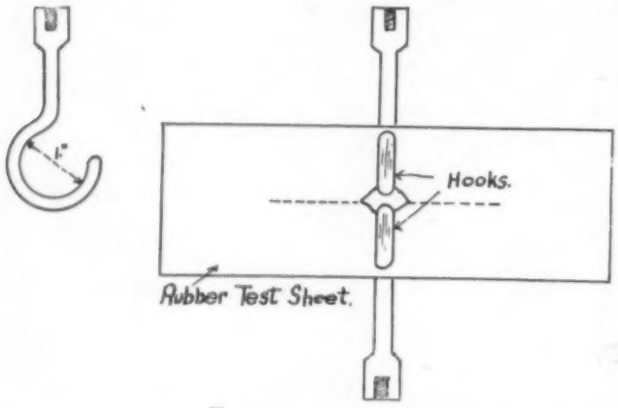


Fig. 1.

compound in this crude fashion. Resistance to tear, as it shall be called in this paper, appeared to be an independent property of rubber and well warranted a more exact measurement.

There are different ways in which a thin slab of rubber may be torn and not all methods of tearing are suitable for the measurement of resistance to tear. After some experimentation it was found that free tearing took place, if a 0.5 in. slit was cut in the center of a slab of rubber in the direction of its length and the slab was supported between two hooks in such a manner that the pull on the hooks was against the sides of the slit. (See Fig. 1) As the hooks moved apart the whole tendency of the rubber to tear was in the direction of the initial 0.5 in. slit, and there was no loss of energy due to friction on the hooks. Such tearing can be produced on most any modern rubber testing machine by replacing the test piece clamps by a pair of hooks.

When a piece of rubber is torn in the testing machine both tearing and stretching take place. The section of the sheet where the tearing is taking place elongates, and the total force expended by the machine is exerted both in tearing and elongating the rubber. The tearing occurs irregularly, and when no tearing is taking place the rubber is elongating and storing up potential energy which will be liberated in part when the rubber begins to tear again. No fixed relationship can therefore exist between the two forces tearing and elongating the rubber during the length of time required to tear the slit, but for any instant the forces are in equilibrium with the external force applied.

Tearing and Elongating Forces

The consideration of force alone as an index to resistance to tear in rubber, since it is indicative of resistance to tear at only one point, is of no value, unless the average force at all points along the slit is taken while the slit is being torn. To do this it is necessary to resolve the total force into the two forces for tearing and elongating and to measure both at every point along the slit. A summation of forces may be taken while the slit is being torn, which represents an average force working through a distance and is therefore a measure of work.

The work done by the machine on the rubber is equal to the product of the distance through which the hooks have separated, and the average force applied in pounds. Thus if an autographic chart of equally spaced pound ruling is made while the slit is being torn, the area under the stress curve will represent the total work applied by the machine. This is shown in Fig. 2 by the area ABDE, and may be expressed as,

$$\text{Work} = W_1 = K \int_A^B F_x dx = Ka \text{ where}$$

"a" is the area under the curve and K is a constant depending upon the relative speeds at which the hooks separate and the chart moves, and the pound ruling on the chart. The work is expressed as inch pounds.

Having the total work expended upon the rubber, it is

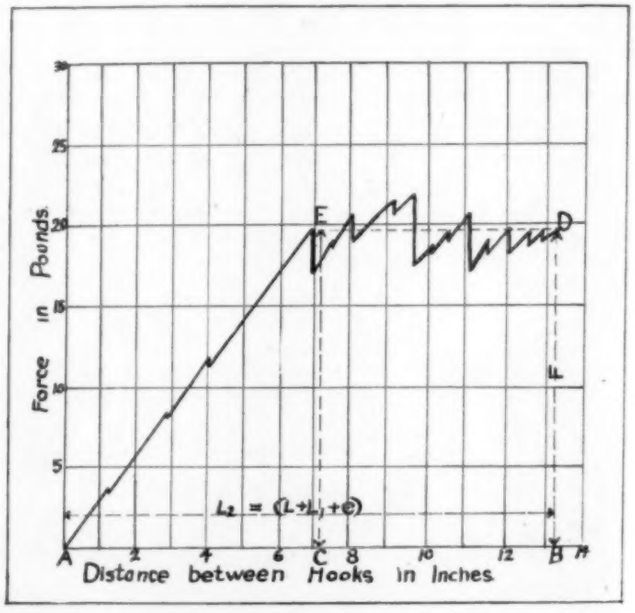


Fig. 2. An Autographic Chart

necessary to find the amount of work exerted in elongation. The amount of elongation that is present in the rubber at any time while the slit is being torn is dependent upon the force required to tear the rubber at that time and upon the length of the slit torn prior to that time, and the relationship is one of direct proportion. The relationship between the elongation and the force required to tear the rubber approximates the

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linear relationship embodied in Hooke's Law. The elongation seldom amounts to more than 150 per cent and extends over that portion of the stress-strain curve which shows the characteristic "S" shape. The "S" shape is quite pronounced in the case of lightly compounded stocks, but practically disappears in the case of highly compounded stocks. As will be shown later the resistance to tear of lightly compounded stocks is so high that the error introduced by the "S" shape of the stress-strain curve is very small and in the case of the highly compounded stocks the stress-strain curve becomes almost a

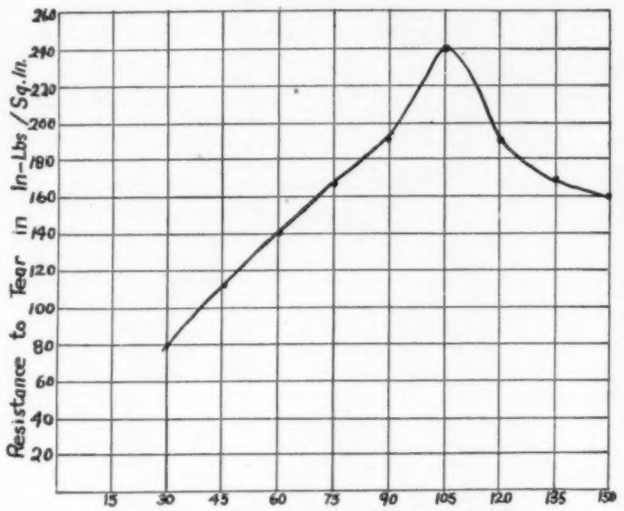

Fig 3

straight line over the portion concerned in resistance to tear. It is therefore permissable to assume that the elongation at any point along the slit is proportional to the force applied to the strip.

Measuring the Work of Elongating

Knowing the relationship between force and elongation, it is an easy matter to obtain the work done in elongating the rubber. It is merely necessary to measure the elongation when the tearing of the slit has been completed, and the force in equilibrium with this elongation. Thus, in Figure 2 let the force F = CE and let the elongation "e" equal the distance AC. The work expended in elongation may be expressed as follows:—

$$\text{Work} = W_2 = \int Y\,dx$$

In this expression "y" is the proportionality of stress to strain for any length of slit torn, and

$$Y = \frac{F}{e} x$$

Substituting this value for "Y" in the above expression:

$$W_2 = \int_0^e \frac{F}{e} x\,dx = \frac{Fe}{2}$$

Now the total work done by the machine both in tearing and stretching the rubber was

$$W_1 = Ka$$

If the work expended in elongation is subtracted from the total work the difference is the work expended in tearing.

$$W_1 - W_2 = Ka - \frac{Fe}{2}$$

This formula as it stands does not take into consideration either the thickness of the test piece or the length of the slit torn. It is necessary to introduce these factors in the above equation so that the work can be expressed on a unit basis. To accomplish this it is only necessary to divide the total work expended in tearing by the length of the slit torn and by the thickness of the sheet of rubber. The formula then becomes:

$$W = \frac{Ka - \frac{Fe}{2}}{Lt} \text{ inch pounds per square inch.}$$

In this formula:

W = Work in inch-pounds to tear a slit one inch in length in a sheet of rubber one inch in thickness.
a = Area in square inches under the stress curve on the autographic chart.
L = Length of the slit torn by the machine in inches.
t = Thickness of sheet of rubber in inches.
F = Final force in pounds when the tearing of the slit has been completed.
e = The elongation in inches.
K = A constant depending upon the machine.

It is possible to read "F" either directly from the dial of the testing machine or from the autographic chart. The area "A" is measured by a planimeter. "L" is measured on the test sheet at the end of the test, the proper deduction being made for the length of initial slit. The elongation "e" is equal to the difference between the final distance between the hooks and the total length of slit in the sheet.

While the correction for elongation in the calculation of resistance to tear is only an approximation due to the deviation from Hooke's Law, it is nevertheless quite accurate, the error introduced being less than the variation of resistance to tear in different test sheets of the same sample.

The thickness of the test sheet has some effect, a thick sheet giving a slightly higher value than a thin one. It is best to

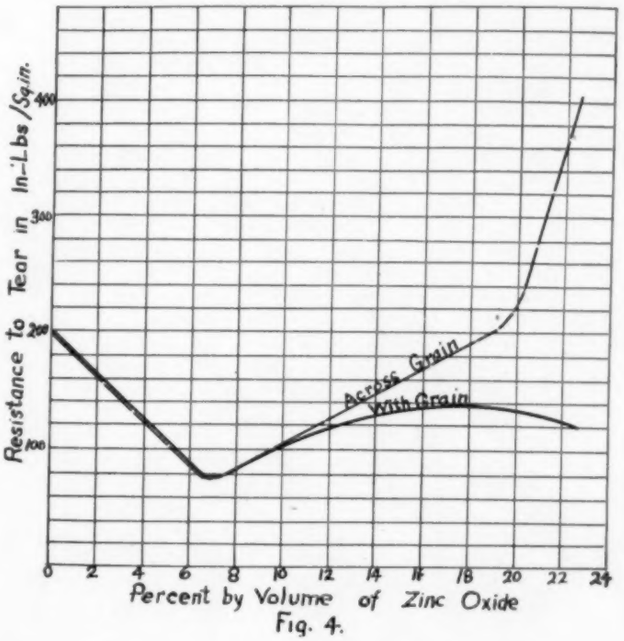

Fig. 4.

use a sheet of a standard thickness of 0.10 inches (0.085 to 0.115 inches). When a fairly uniform thickness of sample is taken the errors introduced due to differences in thickness are negligible. A uniform size of test sheet of 3 inches × 9 inches × 0.10 inches is quite satisfactory for all kinds of stock, and any desired length of slit from 3 inches to 7 inches may be torn.

The speed at which the hooks separate is another matter to be considered. Any speed up to 5 inches per minute is satisfactory, but some constant speed must be chosen and adhered to. A speed of 3 inches per minute has been found suitable for most work. The autographic chart must of course move at a speed which will give an "a" value of suitable size, and its speed must bear a constant ratio to the speed at which the hooks separate.

Tearing Accelerated Pure Gum Stock

A sample calculation is carried through to make the method more clear. The following data were obtained in tearing an accelerated pure gum stock:—

a = Area ABDE Fig. 2	=	2.90	sq. in.
t = Thickness	=	0.114	in.
F = Final force	=	19.5	lbs.
L_i = Initial length of slit	=	0.5	in.
L_d = Distance between hooks	=	11.25	in.
L = Length of slit torn by machine	=	4.50	in.
$L_d - (L + L_i) = e$ = Elongation	=	6.25	in.

$$W = \frac{Ka - \frac{Fe}{2}}{Lt}$$

K = the number of inch-pounds represented by one sq. in. of area on the chart and is equal to 55.6 on the machine used.

$$W = \frac{55.6 \times 2.90 - \frac{19.5 \times 6.25}{2}}{4.50 \times 0.114} = 196 \text{ inch-pounds}$$

A few examples of the application of the measurement of resistance to tear will now be given:

The stock chosen was a non-accelerated pure gum containing 7½ per cent of sulphur and 92½ per cent of smoked sheets. This stock was cured in slabs 3 inches × 9 inches × 0.10 inches at 145 degrees C. in a series of cures extending from 30 minutes to 150 minutes at 15 minute intervals. The data are tabulated in Table 1 and plotted in Figure 3.

Table 1

Length of Cure in Minutes 145° C.	Resistance to Tear in inch-pounds per sq. in.
30	80
45	110
60	140
75	165
90	190
105	240
120	190
135	170
150	160

It is to be noted first of all that a very sharp maximum in resistance to tear is reached on the 105 minute cure, the longer and shorter cures falling off gradually. Maximum resistance to tear corresponds very closely with optimum cure determined in other ways, and occurs somewhat before the maximum in tensile is reached. The type of curve is typical for all pure gum stocks, both accelerated and non-accelerated and for lightly compounded stocks.

Resistance of Highly Compounded Stocks

The resistance to tear of more highly compounded stocks is quite variable depending upon character and amount of fillers present and upon the state of cure. Of the mineral fillers thus far studied zinc oxide is the most interesting, and some data are herewith included on series of compounds in which zinc oxide was the only variable.

The basic compound of the series contained 5.5 per cent of sulphur and 0.5 per cent of hexamethylenetetramine on the rubber, and sufficient zinc oxide was added to give the desired per cent by volume in each compound. The cures were made at 142 deg. C. The results given on Table 2 and plotted in Figure 4 are for the best cures. It was found that when the zinc oxide present in the compound exceeded a certain volume, the resistance to tear showed a marked difference depending on whether the test was conducted along or across the calender grain.

Table 2

% Vol. Zinc Oxide	% Wt. Zinc Oxide	Resistance to Tear in In-Lb/Sq. in. with grain.	Resistance to Tear in In-Lb./Sq. In. across grain.
0.17	1.0	195	195
1.43	7.74	166	166
3.29	16.40	135	130
6.80	29.60	75	74
10.00	38.60	109	103
14.52	49.40	123	159
19.55	58.40	135	200
22.61	62.60	120	350

The results show that as the volume of zinc oxide is increased in the compound up to 7 per cent the resistance to tear decreases from 195 to 75 inch-pounds/square inch and there is no difference whether the test is conducted in the direction of or across the calender grain. When more than 7 per cent by volume of zinc oxide is used resistance to tear again increases, and shows a somewhat higher value across the calender grain than it does in the direction of the calender grain. When 18 per cent by volume of zinc oxide is present resistance to tear reaches a maximum value of 135 inch-pounds/square inch in the direction of the calender grain, and a value of 200 across the calender grain. Beyond 18 per cent, resistance to tear decreases slightly in the direction of the calender grain and continues to increase across the calender grain reaching a value of 350 inch-pounds/square inch at 22.61 per cent by volume.

The zinc oxide used was a product of one of the leading manufacturers and was of standard quality. Not all zinc oxides produce a high resistance to tear in the higher volumes, and some have been tested which gave a minimum of 40 inches-pounds/square inches at 10 per cent by volume, with only a very slight increase for more highly compounded stocks. The character of the milling as regards time and temperature undoubtedly also has some effect on resistance to tear, especially in highly compounded stocks.

All mineral compounding ingredients reduce the resistance to tear of the compound as the volume percentage is increased in the same manner as zinc oxide does. This is true to a lesser extent of oils, mineral rubber, etc. The reduction in resistance to tear with increasing volume of fillers, depends somewhat on the filler, some fillers causing a greater reduction than others.

The effect of length of cure on the resistance to tear of highly compounded stocks is far less pronounced than was found in the case of pure gum stocks. The values of resistance to tear given in Table 2 and plotted on Figure 4 are for the best commercial cure.

Decrease in Labor on Malay Plantations

(By U. S. Consul General Ernest L. Harris, Singapore, Straits Settlements.)

In addition to the depression which obtains in the crude rubber market at present, Malay planters are being faced with acute labor difficulties. In 1921, 7,017 Tamil laborers were recruited, of which 1,492 were brought from India and 5,525 were recruited locally. During the same year, however, 4,311 laborers were discharged and 3,751 deserted, making a net decrease of 1,045 laborers for the year. As the availability of Tamil labor declines, the question of employing Chinese will become important, and the time may soon come when Chinese coolie labor will be employed as largely on the rubber estates as in the tin mines.

Acetone Soluble Constituents of Rubber

It is well-known that independent determinations of the acetone-soluble constituents in rubber often do not agree with each other. Lower results are obtained in making the acetone test when the extract is dried under ordinary pressure at a temperature varying from 90 to 105 degrees C., than when the acetone extract is dried under reduced pressure at a temperature of 50 degrees C. It is almost impossible to obtain concordant results when the test is carried out at the higher temperature and pressure.

Rubber Production in India in 1921

RUBBER is grown mainly in Southern India, Burma, and Assam, and the number of plantations existing in 1921 was 1,016, covering an area of 196,990 acres, as against 892 with an area of 204,663 acres in the preceding year, states the Director of Statistics, India, in a review of the rubber industry of India in 1921.

New lands planted with rubber in the estates during the year were reported to cover 5,635 acres, and the area of old cultivation abandoned 4,990 acres, showing a net increase of 645 acres over the total area, 124,025 acres (revised) in 1920. The total area under rubber in the year 1921 was thus 124,670 acres (or practically the same as in the previous year), of which only 60,721 acres were tapped. Of the total area under cultivation, 47 per cent was in Burma, 32 per cent in Travancore, 9 per cent in Madras, 7 per cent in Cochin, 2 per cent each in Assam and Coorg, and 1 per cent in Mysore.

The total production of raw rubber during the year is reported to be 9,056,430 pounds (Hevea 8,995,780, Ceara 47,520, and Fiscus elastica 13,130), as against 13,788,908 pounds (Hevea 13,655,094, Ceara 76,643, and Fiscus elastica 57,171) in 1920. The yield per acre of tapped area was 199 pounds (against 243 pounds in 1920) in Burma, 93 (222) pounds in Cochin, 170 (199) pounds in Travancore, 54 (142) pounds in Madras, 29 (108) pounds in Coorg, and 53 (52) pounds in Mysore. There was a general decrease in production in 1921, especially in Madras, Coorg, and Cochin, which is attributed to low prices, the slump in the rubber market, and the Moplah rebellion.

The daily average number of persons employed in the plantations during 1921 was returned at 29,404 of which 25,772 were permanently employed and 3,632 temporarily engaged, as compared with 52,466 (40,804 permanent and 11,662 temporary) in the preceding year.

The total stock of dry rubber held on December 31, 1921, was estimated at 3,115,079 pounds (Hevea 3,098,000, Ceara 11,520, and Ficus elastica 5,559), as against 4,999,769 pounds (Hevea 4,926,617, Ceara 55,895, and Ficus elastica 17,257), reported on the corresponding date of 1920.

The export of rubber by sea from British India to other countries during the fiscal year 1921-22 amounted to 11,000,000 pounds, showing a decrease of 21 per cent as compared with the previous fiscal year. The United Kingdom absorbed 63 per cent, Ceylon 21 per cent, the United States of America 9 per cent, and the Straits Settlements 6 per cent of the total exports. Madras accounted for nearly 62 per cent, and Burma 38 per cent of the total trade.

Bolivia Cultivating Gutta-Percha

THE gutta-percha tree is now cultivated in Eastern Bolivia in the territory of the colonies of the northwest, and it is hoped it will take the place of the rubber tree. A prominent firm of former producers of rubber has 150 trees planted and has already extracted some gutta-percha from them. It is noted that the last of the important rubber producers in either the Department of El Beni or in the territory of the colonies of the northwest (Colonias del Noroeste) suspended operations at the beginning of last year.

Crude Rubber Imports into U. S., October, 1922

Figures compiled and distributed by The Rubber Association of America, Inc. 250 West 57th Street, New York City.
(Estimated net weights—long tons)

PLANTATIONS

From	*Tons*
Batavia	725
Belawan-Deli	1,388
Cochin	39
Colombo	3,980
Japan and others	32
Liverpool	415
London	2,647
Malacca	975
Penang	1,570
Port Dickson	125
Pt. Swettenham	1,422
Rotterdam	101
Singapore	8,658
Sourabaya	309
	22,386

AFRICANS

From	*Tons*
Antwerp	552
Liverpool	47
	599

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	3
Guayule (Mexico)	—
	3

PARAS

Iquitos	19
Manoas	475
Para	463
	957

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons
Waste	113
Balata	65
Miscellaneous Gums	71

COMPARISON 1921 - 1922

	Oct.-1921	Oct.-1922	Total Importations 10 months ending, Oct. 31. 1921	1922
Plantations	21,602	22,386	131,748	219,311
Paras	990	957	9,402	8,158
Africans	874	599	1,646	1,677
Central	3	3	78	51
Guayule	—	—	58	281
Manicoba and) Matto Grosso)	—	—	3	122
	23,469	23,945	142,935	229,600

U. S. Rubber Imports and Exports September, 1922

TOTAL imports of unmanufactured rubber into the United States in the first twenty-one days of September were 44,660,215 pounds, valued, according to the invoices, at $6,298,148. This total is substantially more than the imports during the entire month of September last year, which were 35,519,378 pounds, valued at $4,927,883.

The large purchases of India rubber accounted for the increase. These amounted to 44,344,862 pounds, valued at $6,202,136, as compared with 34,546,411 pounds, valued at $4,753,411, in the corresponding month of last year.

Exports of manufactures of rubber during the entire month of September totaled $2,659,308, as compared with $2,101,527 in the corresponding month of 1921. Substantial gains were registered in reclaimed rubber, scrap, hard rubber goods, automobile tires and casings, belting and hose.

The exports of leading items are as follows:

Domestic Exports of India Rubber Manufactures from United States

	September 1921.	September 1922.
Rubber (total) dollars	2,101,527	2,659,308
Rubber reclaimed, lbs.	57,519	160,310
do dollars	5,060	15,473
Rubber scrap, lbs.	296,203	563,542
do dollars	14,613	22,684
Rubber Footwear—		
Boots, pairs	46,435	22,059
do dollars	103,789	54,936
Shoes, pairs	211,227	196,232
do dollars	186,613	118,023
Pneumatic Casings—		
For automobiles, dollars	940,333	1,241,360
Other, dollars	.....	9,971
Pneumatic Tubes—		
For automobiles, dollars	97,528	129,481
Other, dollars	.....	4,388
Solid Tires—		
For autos, trucks, dollars	97,523	112,897
Other dollars	.....	29,967
All other tires, dol	26,574	.....
Tire repair material, dol	.....	22,960

NEWS OF THE INDUSTRY

Meeting of Textile Section, American Society for Testing Materials

COMMITTEE D-13, the Textile Section of the American Society for Testing Materials, held a two-day meeting at New Bedford, Mass., on Oct. 27 and 28. A. E. Jury, of the United States Rubber Co., Chairman of the Committee presided.

At the morning session on Oct. 27 W. O. Jelleme, chairman of the sub-committee on testing machines, reported that no important progress had been made and that it had become necessary to drop the work on abrasion testing temporarily because of lack of funds at the Bureau of Standards, Washington. A paper describing and illustrating a new fiber selector invented by E. D. Walen, manager of the Cotton Research Company, was read by Harry Rose of that organization. The selector developed by Mr. Walen is much simpler than that previously invented by Dr. W. Lawrence Balls of England and no unusual experience is necessary in preparing a sample of cotton for use in the machine.

Kenneth B. Cook, who is associated with the United States Rubber Company, described a modified form of Mr. Walen's fibers selector which has been worked out in his laboratory and which provides an autographic record of fiber length. Alfred Suter described a device for measuring crimp in tire fabrics that had been worked out in co-operation with the Brighton Mills, Passaic, N. J., and demonstrated its method of operation. He also showed a template for use in preparing crimp specimens and Chairman Jury stated that committee D-13 informally recommended this instrument as the best available at the present time. Mr. Cook, chairman of the sub-committee on yarn, thread and twine, reported on typical specifications for imperfections and tolerances for tire yarns and cords, and after reading and discussion the report was re-submitted to the sub-committee for consideration of several suggested changes.

Dr. William F. Edwards of the U. S. Testing Company, chairman of sub-committee 6, read the proposed tentative specifications for imperfections and tolerances for square woven tire fabrics and for tire cords, and the discussion that followed developed the need of further minor revisions and the report was referred back to the committee and will probably be ready for action at the next meeting.

Tire Cord Making Inspected

Twenty-seven members and guests of the committee met at the hall of the Fairhaven Mill on the morning of the 28th and spent more than an hour inspecting the plant. The tire cord twisting, winding and weaving departments were of particular interest to many of those present.

A motion picture was shown after the party returned to the hall, designed to demonstrate to Fairhaven operatives the right and wrong methods of piecing up, at the card, silver lapper, ribbon lapper, drawing frame, roving frame and spinning frame. The Parks-Cramer film "Thirsty Cotton" was also exhibited. A paper was read at this session by C. J. Berkley, of the Goodyear Tire and Rubber Company, on "Control Test Methods" and was briefly discussed.

It was voted to hold the spring meeting of the committee in Providence, R. I., on the last Friday and Saturday in March, 1923.

Rubber and Cotton Men Present

Among the members and guests attending the sessions were the following: Fred Taylor, Firestone Tire & Rubber Co.; W. F. Edwards, U. S. Testing Co.; Horace J. Jaquith, Minot Hooper & Co.; C. B. Finckel, J. H. Lane & Co.; S. L. Weller, Lee Tire and Rubber Co.; W. G. Bruce, Goodyear Tire and Rubber Co.; J. Puraccuin, Ajax Rubber Company; E. H. Grafton, Quaker City Rubber Co.; K. B. Cook, U. S. Rubber Company; J. P. Cantroell, Bureau of Construction & Repair; W. O. Jelleme, Brighton Mills; C. J. Berkley, Goodyear Tire & Rubber Co.; C. S. Cook, Lawrence & Co.; C. I. Bockius, Manhattan Rubber Mfg. Co.; A. E. Jury, U. S. Rubber Company; R. T. Fisher, National Association of Cotton Manufacturers; A. M. Tenney, Wellington Sears & Co.; H. L. Scott, Henry L. Scott & Co.; H. P. Gurney, Boston Belting Co.; Harry Rose, Cotton Research Co.; R. S. Parks, Parks-Cramer Company; Thayer Francis, Parks-Cramer Company; Albert Pierce, Pierce Mfg. Company; Emerson E. Pease, Nat'l Tent & Awning Mfrs. Assoc.; C. C. Davis, Boston Woven Hose and Rubber Co.; W. S. Howard, Lebanon Mill Co.; Wm. A. Goss, Bradford Durfee Textile School; J. W. Cooper, R. P. Sheldon & Sons; Wm. Smith, New Bedford Textile School; A. A. Talmage, N. B. Standard; James T. Brand, United and Globe Rubber Co.; H. C. Holden, B. F. Goodrich Company; C. A. Soch, Hood Rubber Company; B. H. Foster, U. S. Rubber Co.; G. S. Mattruy, Johnson & Johnson; James Thomson, Fairhaven Mills; B. S. Cottrell, Parks-Cramer Co.; James McDowell, Sharp Mfg. Co.; Alfred Suter, New York.

Mason Raises Tire Prices

Mason Tire & Rubber Co., Kent, Ohio, is among the first tire manufacturers to announce an advance in prices. A five per cent increase will be effective Nov. 15, according to reports in the Akron newspapers. The recent advance in crude rubber prices is given as the principal reason, although the high price of cotton and the inevitable advance in the prices of tire fabrics will undoubtedly prove another important factor.

Mason stockholders recently approved the issuing of 200,000 shares of no par common stock at $12 a share, for the purpose of increasing manufacturing facilities to bring tire production up to 5000 casings daily. It was hoped to start producing on this basis Nov. 15.

Ford Not to Buy Dunlop Plant

The report that the Ford Motor Co. might purchase the $20,000,000 plant of the Dunlop Tire & Rubber Corp. of America at Buffalo, which has never been in operation, has been denied by Ford officials at Detroit. It is understood that the parent Dunlop company in England is putting through a $10,000,000 financing plan for the purpose of operating the American plant.

16,600 Gallons of Latex Coming

The third shipment of rubber latex has left Colombo, Ceylon, for the United States, amounting to 16,600 gallons. The latex is shipped in iron drums to Singapore where it is poured into specially prepared tanks on the steamships. At the destination the consignee pumps the latex into other tanks which are ready to receive it from the ships. Shipments are reported to have reached this country in satisfactory condition.

The question naturally arises: Who is getting all this latex and for what purposes is it intended? The readers of THE RUBBER AGE would like to be enlightened on this important subject.

R. A. A. and R. G. A. Exchange Cables on Crude Rubber Restriction

REFERRING to our General Bulletin No. 173 of October 28, which outlined the action of the board of directors and a special committee of The Rubber Association of America in opening negotiations with the Rubber Growers Association of London, concerning the restriction of crude rubber production by imposing a graduated tax on exports:

The following response has just been received to the committee's cable expressing the deep interest of our manufacturers in the restriction plan and inviting a committee from the Rubber Growers Association to visit the United States to discuss the mutual interest in the restriction plan:

"Council of Rubber Growers Association thank you for friendly message and cordial invitation to New York but consider that as the scheme has only just been started it will be best to wait and see what effect it has on all branches of the rubber industry. Meantime we shall welcome your Associations considered advices in regard to U.S.A. needs of crude rubber during 1923 as we are all opposed to any idea of creating actual shortage of supplies. We therefore feel that American manufacturers need have no fear that the scheme will work adversely to their interests."

R. A.'s Second Offer of Co-Operation

Referring to General Bulletin No. 178 of November 8 quoting cable reply from the Rubber Growers Association of London to our invitation for a conference with respect to the restrictive tax on crude rubber:

The special committee of this association met Nov. 9 and gave consideration to the reply, with the result that the following cable was prepared and sent to the Rubber Growers Association:

"The invitation extended to the Rubber Growers Association to send a committee to the United States is prompted by a sincere desire for a better, broader and more sympathetic understanding between growers and manufacturers. We regret that our invitation is not accepted now as we feel that the good of the industry requires a closer contact and we believe that if your members have the opportunity of meeting our manufacturers here we would both secure a broader vision than would be possible should we send a committee to London. In reply to your inquiry as to the probable American consumption in 1923, we could, upon receipt of advices from you as to the probable range of prices under the Restriction Act, arrive at a closer estimate of the probable consumption."

A. L. VILES, General Manager

On Nov. 14 the following cablegram was received from the chairman of the Rubber Growers' Association of London:

"Your cablegram of 10th. Full reply mailed today. If, after reading you think immediate meeting advisable will send representatives. As to second inquiry, assume average price 1923, one shilling, three pence, per pound."

Immediately on receipt of the letter referred to the Special Committee of the Rubber Association will meet.

Rubber Association News Notes

The board of directors of the Rubber Association met at the Lotos Club, New York City, on Nov. 23, for its regular monthly meeting.

The executive committee of the Tire Manufacturers Division held its November meeting on the 15th, the session being given over almost entirely to the consideration of standards and to the discussion of the proposed employment of the Harvard School of Business Research to study conditions in the retail tire dealing trade and submit recommendations as to desirable accounting and merchandising methods for retail tire dealers.

The specification committee of the Mechanical Rubber Goods Manufacturers Division met in Washington on Nov. 15 with the packing committee and the rubber goods committee of the Federal Specifications Board, which has as its purpose the simplification and coordination of governmental specifications for all goods purchased by the government, and a number of detailed changes in the proposed specifications for packing and several classes of rubber hose were recommended by the association committee and accepted by the board representatives.

The executive committe of the Rubber Sundries Manufacturers Division met at the Union League Club, New York City, on Nov. 14, and a number of important subjects were considered.

The Hard Rubber Division met at the Yale Club, New York City, on Nov. 8 and questions of importance to that group were discussed.

The service managers committee of the Tire Manufacturers Division met in the Tire and Rim Association office at Cleveland, Ohio, on Nov. 2 and 3.

The Traffic Committee met at the New York Athletic Club, New York City, on Nov. 14.

The Original Equipment Committee, which is composed of the executives of the tire manufacturers furnishing tires as original equipment to car manufacturers, met at the Lotos Club, New York City, on Nov. 14.

A sub-committee of the Executive Specification Committee on Tires met in the association office on Nov. 21.

Death of Albert A. Jenks

Albert A. Jenks, 63 years old, president of the Jenckes Spinning Co. of Pawtucket, R. I., and the Pilgrim Mills of Fall River, Mass., died suddenly from heart failure while riding in his car from Little Compton, R. I., on Nov. 7. He was prominent in the cotton textile industry of New England and New York City. A widow and a son, Robert R. Jenks, survive him.

Two New Firestone Films

"The Burden Bearers" and "Lightening the Load" are two new motion picture subjects released by the Firestone Tire & Rubber Co. in conjunction with its exhibit containing samples of different grades of rubber used in making tire casings and inner tubes, cross sections of various sized tires, samples of tire fabrics, etc. Included in the exhibit also are thirty copies of the new Firestone book, "Rubber: Its History and Development," containing photographic illustrations of plantation and factory operations. The complete exhibit is on display in the engineering college building of Akron University.

The films were recently screened in the chemistry building under supervision of Prof. H. E. Simmons. "The Burden Bearers" shows how truck tires and rims are made at the Firestone plant. The manufacture of giant cord tires is depicted in "Lightening the Load."

Mechanical Goods Prices Rise

The mechanical rubber goods department of the U. S. Rubber Co. has withdrawn all existing open quotations on belting, packing, hose and other specialties and will furnish the trade with new price lists as soon as possible, which will show a considerable advance over present prices. The recent steady rise in the rubber and cotton markets is given as the reason for the new and higher prices. There has been a gradual improvement in the mechanical rubber goods business of late months, which will probably not be affected to any extent by the contemplated price revision upward.

New U. S. Rubber Building

The United States Rubber Co. will occupy a new two story and basement concrete building, to be used for show rooms, stock, and offices, at the corner of Charles River parkway and Vassar street, Cambridge, Mass., on a ten year lease.

New Rubber Products Officials

C. C. Schutz, general manager of the Rubber Products Co., Barberton, Ohio, has succeeded W. A. Johnston, founder and president, who has resigned. The latter's son, W. A. Johnston, is now vice president; John Wiley is treasurer; and J. B. Chisnel, secretary. Members of the board of directors are E. J. Schutz, John Blaser, Joseph Johnston, Frank Graham, and F. M. Hickman.

Making Ace Cord Tires

The Ace Rubber Co., Hudson boulevard, Union Hill, N. J., is a new plant engaged in the manufacture of Ace cord tires of which 1000 have been made so far. Capacity of the factory is 100 casings daily, which is to be enlarged. The latest safety devices are installed.

M. E. Clark Heads Tyer Rubber

At a meeting of the directors of the Tyer Rubber Company, Andover, Mass., held Nov. 13, Myron E. Clark was elected president and Walter E. Piper treasurer. The company was established in 1856, now manufactures druggists' sundries and automobile tires, and will soon engage in the manufacture of footwear.

MYRON E. CLARK

Mr. Clark was formerly factory manager of the Goodyear India Rubber Glove Mfg. Co. and the Goodyear Metallic Rubber Shoe Co., both of Naugatuck, Conn., and later was general manager of the footwear and miscellaneous factories of the United States Rubber Company.

Mr. Piper was formerly manager of the Boston Rubber Shoe Company factories in Malden and Melrose, Mass., and during the war was located at Washington, D. C., in charge of purchasing rubber footwear for the United States Army.

Chalmers Motor Receivership

With the idea of liquidating the Chalmers Motor Corporation and merging the business with that of the Maxwell Motor Corporation, the Maxwell treasurer, B. E. Hutchinson, has been appointed receiver of the former concern. The Chalmers assets will be sold early in December and will probably be bid in by the Maxwell company which has claims against the former amounting to $6,800,000.

Ross President of Rainbow

In an article concerning the Rainbow Tire & Rubber Co., Delaware, Ohio, in the Oct. 25 issue of this publication, the statement was made that C. A. Morrison was president of the company. Charles E. Ross writes us from his office, 302 Southern Hotel, Columbus, Ohio, that he has been president of this company ever since its organization and is still its executive head. The erroneous information was taken from a Delaware, Ohio, newspaper.

Personals

Frank Titus, second vice president of the International B. F. Goodrich Co., accompanied by Mrs. Titus, sailed for Europe on the Berengaria on Nov. 21. Besides engaging in conferences with officials of the company he will make a study of business conditions abroad, especially as they affect the rubber industry.

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Wilson H. Blackwell, treasurer of the U. S. Rubber Co., recently sailed for Europe to look after the company's interests.

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R. W. Brouse, manager of the Goodrich branch in Buffalo, N. Y., has been transferred to take charge of manufacturers' sales in the eastern district. He has been with Goodrich for fourteen years.

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Frank F. Forrd, New Zealand representative for several American concerns, recently had several conferences with officials of the Star Rubber Co. in Akron. He will probably represent the Star line in his country.

• • •

C. G. Gislow, rubber manufacturer of Sweden, was a recent visitor at the Goodyear plant in Akron, purchasing tire construction equipment from the by-products department.

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B. F. Pickens, formerly in charge of sales for Amazon, has been appointed sales manager for the Tuscora Rubber Co., Dover, Ohio.

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Dr. W. C. Geer, Goodrich vice-president and author of "The Reign of Rubber," was a recent speaker at Akron University on some phases of the subject of closer co-ordination of college and industrial work. He addressed the students during the assembly period.

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W. W. Sayers former representative of the Link-Belt Co. in the Chicago territory, has been promoted to be chief engineer of the company's Philadelphia works and eastern operations.

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Ernest Gilder, formerly manager of the South African branch of the United States Rubber Co., is now in charge of the London branch of the company, succeeding H. H. Holland.

• • •

Joseph Middleton, who has represented the U. S. Rubber Co. in Ireland and northern England for seventeen years, has resigned and joined the Hood Rubber Co. in the same capacity.

• • •

J. V. Aguirre, manager of Mason's export department, recently returned from a five months' trip through Mexico, the West Indies, and the countries bordering on the Caribbean sea. He reports improvement in the tire business in all these countries.

Los Angeles Rubber Club

A local organization of this name was recently formed in Los Angeles, Calif., with a membership consisting of officials of local rubber goods manufacturers, branch managers of leading rubber companies, and tire and rubber goods dealers. J. B. Magee, branch manager for U. S. Rubber, is president; A. Schleicher, president of Samson Tire & Rubber Co., vice president; Frank Price, of Nelson & Price, tire dealers, secretary and treasurer.

The object of the club is to foster co-operation among all its members, check unfair trade practises, raise the business standards of dealers, and educate the buying public to a better appreciation of tires and other rubber goods. Luncheon meetings will be held every Friday.

Miller Adds Two Factory Units

The Miller Rubber Co. plans to erect two additional factory units in Akron, one to be 40 by 42 feet and to cost $5000; the other to be 70 by 105 feet, to cost $15,000.

Schlosser U. S. Rubber Gen. Mgr.

George Schlosser has been appointed general manager of the footwear and miscellaneous factories of the United States Rubber Co., succeeding Myron E.

GEORGE SCHLOSSER

Clark who has been elected president of the Tyer Rubber Co. Mr. Schlosser started in the rubber industry forty years ago as an office boy and is one of the oldest employees of the company. He is widely known and highly respected in footwear circles, and is generally recognized as one of the outstanding figures in rubber manufacture in this country.

Activities of Societa Pirelli

Differing widely from its sister industry in the United States, the Italian rubber industry is identified almost entirely with the Societa Pirelli. At the present time the capital stock of this organization amounts to 120,000,000 lire, its employes number 9,000, and its factories and office buildings cover about 100 acres of ground. It was organized in 1872 with a capital of 200,000 lire, employed 44 workmen, and occupied one small building.

This company operates a number of factories and sales offices throughout Italy, as well as in many foreign countries. The Spezia factory in Italy is devoted exclusively to the manufacture of submarine cables. At Vercurago another plant is used for the preparation of chemical products to be mixed with gum elastic. In Villaneuvay Geltru on the Catalan Riviera, about 25 miles from Barcelona, the company operates its Spanish plant. This branch was established in 1901 because of the unfavorable Spanish customs tariff.

Similarly, it is reported that branch factories are operated at Southhampton, England, and Buenos Aires, Argentina, and purchasing offices are maintained in India and Java for the purpose of securing raw materials.

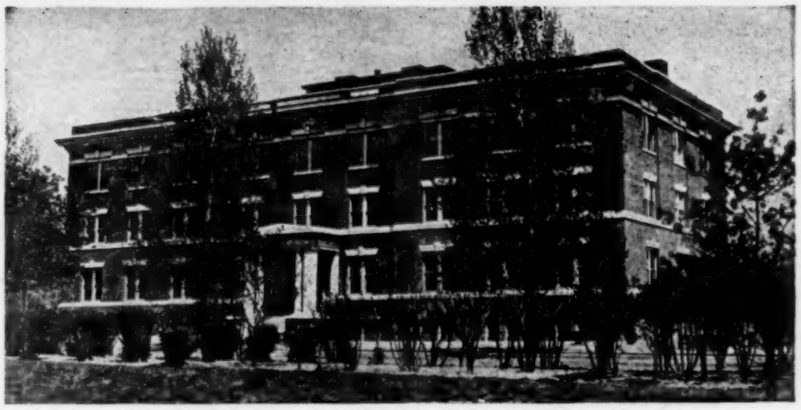
Societa Pirelli manufactures all kinds of rubber goods, from technical articles of industrial use to those of domestic and personal use, such as sanitary articles, waterproof clothing, and toys. It is perhaps best known for its tires and electrical conductors. In the branch of the insulated electrical conductors the company produces a great many types of wires and cables for the transportation and distribution of electrical energy, for telephones and telegraphs, for signal apparatus, for electrical machinery, and for aerial, underground, and submarine lines. It is reported that the production of insulated electrical conductors of all kinds during the war amounted to 3,000 kilometers (1,875 miles) per day.

Rubber Co.'s $50,000 Suit

The Pine Tree State Rubber Heel Co. which was to have taken over a woolen mill property at Sabatis, Maine, for the manufacture of rubber heels, has brought suit for $50,000 against John E. McCarthy and Guy E. Flagg, of Lewiston, Maine, alleging breach of contract on the refusal of the latter gentlemen to turn over the deed to the property. Real estate attachments in this amount are sought against the property of the two men. The writ is returnable at the January term of the supreme court in Auburn, Maine.

Erie Operations Resumed

Manufacturing operations were resumed at the plant of the Erie Tire & Rubber Co., Sandusky, Ohio, on Oct. 26, after the factory had been closed for several weeks.



Rubber Research Laboratory of New Jersey Zinc Co.

AT Palmerton, Penn., are located the laboratories of the Research Division of the New Jersey Zinc Company where the work of developing new pigments is carried on. The rubber section of the laboratories endeavors to advance the interests of rubber goods manufacturers by the discovery and development of new methods of test and attack on rubber pigments and the application of this knowledge under practical manufacturing conditions.

The equipment of the rubber laboratory is ample for experimenting on problems of mixing, vulcanizing and testing rubber compositions both physically and chemically. There is apparatus for the analytical examination of rubber, resins, compounding ingredients and pigments for measuring tensile properties, abrasive resistance, etc.

Adjacent to the laboratories is an experimental tire plant where tires are made and tested on company automobiles. The plant is equipped to manufacture 3½ fabric tires and 4, 4½ and 5-inch cord tires.

Pneumatic Car Seats Now

A. G. Underwood, sales manager for Goodrich, announces pneumatic automobile seats which his company is making and marketing for Ford cars. The new product consists of a slip cover which laces along one edge, into which is fitted a rubber bladder inflated with air like the inner tube of a tire. When deflated this bladder can be rolled into a small bundle weighing only three pounds. It is thought that these air-cushioned seats will make riding in "flivvers" almost as comfortable as in heavy, expensive cars.

Tire Companies' Dividends

Four Akron tire companies recently declared dividends, in each instance on the preferred stock. American declared a regular quarterly dividend of two per cent; Kelly-Springfield the same, payable Nov. 15 to stock of record Nov. 1; Miller's dividend was at the same rate, payable Dec. 1 to stock of record Nov. 10; and Firestone announce a regular quarterly dividend of 1¾ per cent, payable Nov. 15 to stock of record Nov. 1.

$150,000 Fire in Cord Mills

Two buildings of the Maillison Braided Cord Mills, Athens, Ga., were destroyed by fire Oct. 21 with a loss of $150,000. The plant is to be rebuilt on more modern lines, according to L. F. Edwards, president and J. S. Goetchius, secretary.

Aerial Runways for Tires

C. B. Whittelsey, president of the Hartford Rubber Works, Hartford, Conn., has asked the local board of street commissioners for permission to erect an overhead aerial runway to span Bartholomew avenue connecting buildings on both sides, to be at least thirty-five feet above the street level. The purpose of the runway is to make delivery of tire casings quicker and easier than by truck or other methods.

Mr. Whittelsey assured the board there was no danger of tires dropping to the street and injuring passers-by or vehicles. The runway is to be of light, temporary construction which can readily be removed if found advisable.

Callaway Mills, Inc., Have Tire Fabric Account

The Callaway Mills, Inc., selling agents representing the Callaway chain of mills at LaGrange, Georgia, has secured the account of the Athens Manufacturing Co. of Athens, Georgia. This mill produces a high grade carded peeler cord fabric. It is said that Callaway Mills, Inc., are more than simply selling agents and that the Athens company will go more extensively into the production of tire fabrics. At present the plant has a capacity for about 50,000 pounds of tire fabric a week. A. G. Dudley is president of the Athens Mfg. Co. and Fuller E. Callaway head of the Callaway Mills, Inc.

"The Story of a Tire"

This is the title of a new three-reel motion picture produced by Goodyear for use by its distributors for whom ten prints are now available at the Akron plant. There are scenes on the Goodyear plantation in Sumatra, the cotton plantation in Arizona, and the cotton mills at Goodyear, Conn. Other pictures showing the construction of casings and tubes were made in the various factories at Akron. The film is said to be one of the most complete of its kind put out by tire manufacturers.

Allen Officials Retire

Announcement was recently made by Wilmer Dunbar, president of the Allen Tire & Rubber Co., Allentown, Pa., of the retirement of J. T. Leathers, treasurer, and A. C. Leathers, vice president. Tom S. Johnson, secretary of the company, has been elected treasurer. The vice presidency is vacant for the present.

Doss Adds New Mill

A new mill installed in the plant of the Doss Tire & Rubber Co., Atlanta, Ga., has added fifty per cent to the manufacturing capacity. The plant has been running on day and night shifts for several months. Thomas J. Davis, who was connected with the company during its early organization period, has rejoined it. C. C. Harper is president.

Stock Salesmen Settle

E. F. Marcha and F. H. Kelsey, of Cleveland, who last spring pleaded guilty to selling stock in the Paramount Cord Tire Co. on false pretenses to citizens of Lisbon, Ohio, on reporting to the common pleas court in that city Oct. 19 that they had satisfactorily adjusted all claims against them, were permitted to pay each a fine of $100 and costs of more than $300 and discharged.

Keystone Deficit $161,385

The Keystone Tire & Rubber Co., New York City, in its six months' statement ending June 30, 1922, reports net sales of $543,955 and a deficit of $161,385 after all charges and other deductions were made. On that date the profit and loss deficit amounted to $1,629,514.

Receiver for Perfection

Charles C. Keedy has been appointed receiver for the Perfection Tire & Rubber Corp., Fort Madison, Iowa, upon application of the Nemours Trading Corp., Wilmington, Del., an unsecured creditor for $52,193.33. The complainant claims that the defendant company is insolvent.

Ask Receiver for Old Hickory

Arthur M. Kard of East Orange, N. J., and twenty-two other stockholders of the Old Hickory Tire Company applied on Nov. 9 for the appointment of an equity receiver to take charge of the company's assets. An injunction was asked to restrain the concern from making further sales of stock. The court directed the officers of the company to show cause on Nov. 22 why the application should not be granted.

Big Link-Belt Catalog

The Link-Belt Company of Chicago, Philadelphia, and Indianapolis announces completion of its new General Catalog No. 400 which embraces their entire line. It is the most complete book ever issued on this subject. It contains 832 pages, is cloth bound, and can be obtained from any Link-Belt branch office. This catalog includes not only the complete Link-Belt line, but also the products of the H. W. Caldwell & Son Co. plant.

2000 Tubes Daily at Falor's

The Falor Mfg. Co. is now in its new tube factory in North Akron and is producing 2000 inner tubes daily, according to its president, Shelby Falor.

1000 Tires Daily at Youngstown

E. H. Fitch, general manager of Republic Rubber Co., looks for a daily tire production of 1000 at the Youngstown, Ohio, plant at an early date. October orders for tires and mechanical rubber goods established a new sales record.

Norwalk's Chicago Office

The Norwalk Iron Works Co., South Norwalk, Conn., manufacturers of air and gas compressors and refrigerating machinery, has opened a Chicago office at 627 West Washington boulevard, in charge of L. R. Bremser.

Texas Plant Sold

The Universal Tire & Rubber Co. plant at Houston, Texas, has been sold to the company's bondholders for $30,000, subject to approval of the district court. The property consists of a 30-acre tract, a fire-proof building 80 by 375 feet, and about $111,000 worth of tire and tube machinery. H. W. Brown, of Houston, representing the bondholders, is in charge of the property. It is hoped to interest Eastern capital in reopening the plant.

Holtite Doubles Output

The Holtite Mfg. Co., Ostend and Warren streets, Baltimore, Md., will erect a one story brick daylight addition to its plant, 50 by 155 feet, thus doubling its output. The company manufactures Holtite rubber heels.

New Cordtex Factory

The Cordtex Mills Co., Elyria, Ohio, has opened a new factory to manufacture special cord fabrics for tires.

Rufenacht to Double Output

Rufenacht Rubber Co., Bucyrus, Ohio, plans to double the capacity of its plant after Jan. 1, 1923. The company is now making 200 tire casings daily.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires

November, 1920 to September, 1922, inclusive

"Production" and Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

(Compiled by The Rubber Association of America, Inc.)

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
November, 1920	36	5,880,016	649,742	806,023	40	6,131,935	742,815	920,938	11	298,875	21,355	34,217
December, 1920	43	5,508,380	506,111	1,327,153	43	5,786,929	508,446	1,481,285	12	303,473	16,297	40,828
January, 1921	45	5,319,605	703,430	965,417	47	5,586,163	740,824	1,042,617	12	303,753	21,220	29,116
February, 1921	45	5,193,018	819,892	1,073,756	46	5,415,464	916,627	1,129,881	12	304,374	23,365	29,599
March, 1921	46	4,597,103	1,163,314	1,614,651	48	5,044,861	1,346,483	1,643,690	12	283,800	28,710	43,926
April, 1921	49	4,527,445	1,651,418	1,785,951	51	4,916,772	1,762,122	1,983,571	12	269,985	28,859	42,080
May, 1921	59	4,451,668	2,100,917	2,085,882	57	4,751,880	2,210,040	2,342,567	12	264,663	35,156	40,122
June, 1921	63	4,154,456	2,313,265	2,643,850	60	3,835,098	2,359,928	3,232,673	11	240,336	28,395	49,867
July 1921	63	3,892,037	2,570,524	2,757,581	61	3,122,815	3,020,981	3,603,248	11	220,003	35,123	55,678
August, 1921	66	3,934,853	3,043,187	2,894,442	64	3,649,319	4,430,152	3,804,060	11	216,367	55,694	66,866
September, 1921	63	3,340,798	1,929,268	2,047,929	62	3,827,830	3,274,822	2,645,758	11	161,832	37,441	50,276
October, 1921	64	3,545,030	1,928,271	1,675,169	64	4,732,016	2,843,918	2,016,371	10	163,299	46,274	45,911
November, 1921	64	3,908,342	1,756,555	1,342,519	63	5,203,568	2,126,211	1,540,299	10	173,451	43,537	34,556
December, 1921	64	3,696,519	1,839,738	1,980,264	64	4,731,021	2,070,098	2,522,710	10	168,515	40,478	39,520
January, 1922	66	4,174,216	2,055,134	1,596,806	66	5,246,647	2,343,393	1,889,724	11	181,769	40,224	33,294
February, 1922	66	4,691,329	2,084,308	1,562,365	65	6,141,956	2,596,774	1,702,583	11	183,448	39,492	36,805
March, 1922	63	5,183,286	2,645,790	2,073,963	63	6,991,118	3,017,511	2,090,737	11	182,197	49,433	48,350
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797

MARKETS

Cottons and Fabrics

NEW YORK, Nov. 18, 1922

THE advance of spot cotton to 26.80 brought quotations back to the early autumn figures of 1920. Immediately following the Census Department report showing that 8,139,000 bales had been ginned prior to November 1, cotton prices rose violently—advancing during the day nearly $5.00 a bale in the contract market. The effect on both trade and speculative sentiment was very pronounced and the enormous buying produced the most exciting trading of the season. Included in the ginning report were 13,335 bales of American Egyptian and 8,077 bales of Sea Island cotton.

Ginnings to November 1 last year totaled 6,646,354 bales and included 11,812 bales of American Egyptian and 1,816 bales of Sea Island. The figures show that only 1,177,000 bales were ginned in the two weeks ended Nov. 1 as compared with 3,099,000 in the preceding fortnight and with 1,149,000 in the same two weeks of the short crop of 1921. It was more particularly the comparison with last year's ginning and not so much consideration of the 7,508,000 bales ginned two years ago, when the crop yield was over 13,000,000 bales, that produced the exited advance.

The advance of cotton to a new record price for the year was reflected in every department of the fabric market and the higher fabric prices were well maintained at high levels.

The largest monthly consumption of cotton since June, 1920, was reported for October—a total of 533,950 bales being used by manufacturers. This was an increase of 38,000 bales over October last year. Cotton on hand October 31 was as follows: In consuming establishments, 1,379,770; in special storage and at compressors, 4,329,902 bales. Active spindles numbered 33,859,076 bales compared with 34,206,179 in October last year.

There was some increase in imports of foreign cotton during October; as much as 4,952 bales of Egyptian arriving. This increase is due to the lower prices now being asked for Egyptians; prices that are lower in fact than those asked for peelers of a comparable grade and length.

Prices eased off during the last few days and quotations as of November 17 on the New York Cotton Exchange were as follows:

	Open.	High.	Low.	Close.	Prev. Day.
Dec.	25.50	25.70	25.08	25.68-69	25.30
Jan.	25.30	25.70	24.95	25.67-70	25.15
March	25.35	25.64	24.90	25.60-64	25.15
May	25.08	25.48	24.80	25.45	24.93
July	24.82	25.15	24.50	25.13-15	24.80
Oct.	23.35	23.62	23.15	23.65-B	23.32

EXTRA STAPLE COTTON

There was excellent demand for Egyptians during the period and prices showed material advances. Spot was snapped up whenever it could be bought, especially Sak. Medium grade Sak advanced to 39 cents and in some quarters went as high as 41 cents. Medium grade uppers at the close of the week sold at 33 to 33¾ cents.

Pimas advanced toward the 40 cent mark; a high figure for some time. No. 1 brought 39½ cents; No. 2, 37½ cents; No. 3, 35½ cents. Peruvian mitafifi is in limited demand at 31 to 32 cents. High grade Tangris brought 32½ to 33½ cents with slight demand. Extra choice Sea Island is quoted at 42 to 43 cents.

Prices for extra staple cotton, strict middling grade, are as follows: inch and one eighth, 31 to 32½ cents; inch and three sixteenths, 33 to 34 cents; one and a quarter inch, 35 to 36½ cents; one and five sixteenths, 37½ to 39 cents.

TIRE FABRICS

Tire fabric sales are on the increase and several large tire manufacturers are reported to have made large fabric commitments during the past few weeks. The tendency still continues toward cord tire production but in some mills the new machinery installed is adapted to turn from cord to builder fabric construction. Fuller E. Callaway, head of Callaway Mills, Inc., of La Grange, Georgia, commenting on the tire fabric business expressed the opinion that the tire fabric industry like the automobile industry was undergoing a weeding-out process that will leave it more stabilized and better prepared to meet the increased demands of the future. He believes that tire fabric prices are due to go higher and predicts that within 60 days there will be a general advance in the prices of automobile tires.

CORD FABRICS

Combed Sakellarides	.78	@	.80
Carded Sakellarides lb.	.71	@	.73
Combed Peeler lb.	.66	@	.68
Carded Peeler lb.	.60	@	.65
Combed Egyptian uppers lb.	.72	@	.75
Carded Egyptian uppers lb.	.65	@	.70

SQUARE WOVEN

17¼-ounce Egyptian uppers, combed lb.	.69	@	.72
17¼-ounce Egyptian uppers, carded lb.	.62	@	.67
17¼-ounce Sakellarides, combed lb.	.74	@	.76
17¼-ounce Sakellarides, carded lb.	.67	@	.69
17¼-ounce Peeler, combed lb.	.63	@	.65
17¼-ounce Peeler, carded lb.	.56	@	.60

SHEETINGS—There was an advance of from three-quarters to one and a quarter cents in sheetings in an active market that followed the upward trend of cotton prices. Latest quotations on 40 inch, 285 yards, showed 15¼ cents, first hands with one quarter less in second hands. There were reports of 17 cents net for 40 inch, 250 yard in second hands and quotations ranged upward from 18 cents net in first hands; 40 inch, 3.60 yard brought, 13½ cents.

DUCKS—Higher prices ruled in every department of this market. Single filling at the close of the period was quoted 20½ cents at 22 cents and double filling 22½ at 24 cents. Shoe ducks advanced to 55 cents and hose was finally quoted at 46 at 47 cents. The Bureau of Standards announced on November 16 the publication of a circular showing the new specifications for numbered cotton ducks which can be had upon application to the Superintendent of Documents, Government Printing Office, Washington, D. C.

BURLAPS—Calcutta prices continued to maintain a strong upward tendency which was reflected in the local market. The actual daily business transacted was only fair but there was reported a large volume of inquiries.

SHEETINGS

40-inch 2.50-yard yd.	.18	@	—
40-inch 2.85-yard yd.	.15¼	@	—
40-inch 3.15-yard yd.	.15¼	@	.15½
40-inch 3.60-yard yd.	.13½	@	—
40-inch 3.75-yard yd.	.12	@	—
40-inch 4.25-yard yd.	.11	@	—

DUCKS

Belting lb.	.46	@	.47
Hose lb.	.46	@	.47
Enameling lb.	.48	@	.50
Shoe Ducks lb.	.55	@	—
Single filling lb.	.20½	@	.22
Double filling lb.	.22½	@	.24

BURLAPS
(Carload Lots)

8 -ounce 40-inch 100 yds.	7.00	@	7.25
7½-ounce 40-inch	6.80	@	6.90
10 -ounce 40-inch	8.65	@	8.80
10½-ounce 40-inch	8.75	@	9.00

DRILLS

37-inch 3.25-yard yd.	.14	@	—
37-inch 2.75-yard yd.	.15¾	@	—
37-inch 3.00-yard yd.	.14¾	@	—
37-inch 3.50-yard yd.	.13½	@	—
37-inch 3.95-yard yd.	.12½	@	—

OSNABURGS

30-inch 7-ounce	.17	@	—
40-inch 7-ounce	.17	@	—

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, NOVEMBER 18, 1922—Operations in the industrial chemical market during the fortnight were of a routine character. The market on the whole was gratifyingly steady but the activity that immediately followed the passage of the tariff act has subsided to a certain extent. There were no important price changes in any of the principal items and such changes as were noted were upward, though fractionally so. Sellers seem well content with the present level of prices and buyers are apparently satisfied that prices are fair in view of general conditions in the producing industry. Many items continue in light supply and in fact there is little in the way of a surplus in any item.

ACCELERATORS

Organic

Aldehyde ammonia, crystals	lb.	$ .93 @	.95
Aniline oil, bulk basis	lb.	.16 @	.17
Excellerex	lb.	.40 @	.45
Formaldehyde-Aniline	lb.	.52½ @	—
Hexamethylene-tetramine	lb.	.95 @	.97½
Paraphenylenediamine	lb.	1.55 @	1.57
Thiocarbanilide, kegs	lb.	.28 @	.30
Vulcocene	lb.	.35 @	—

Inorganic

Lead, dry red bbls.	lb.	.09 @	.09¼
Lead, white, basic carbonate	lb.	.07¼ @	.08
Litharge, domestic	lb.	.09⅝ @	—
imported	lb.	.17 @	—
Lime, Superfine	lb.	.02 @	.02½
Magnesia, calcined, light	lb.	.23 @	.24
extra light	lb.	.45 @	—
heavy	lb.	.05 @	.05½
Orange Mineral	lb.	.13¼ @	.14¼

COLORS

Blacks

Carbon Black	lb.	.16 @	.20
Micronex	lb.	.17 @	24
Lamp Black	lb.	.12 @	.40
Bone "	lb.	.05½ @	.07½
Drop "	lb.	.07½ @	.16
Ivory "	lb.	.15 @	.45

Blues

Prussian	lb.	.55 @	.60
Ultramarine	lb.	.10 @	.35
Cobalt	lb.	.21 @	.26

Browns

Iron oxide	lb.	.05 @	.06
Sienna, Italian	lb.	.04¾ @	.05¾
Umber, Turkey	lb.	.05 @	.06
Vandyke, domestic		.06 @	.07

Greens

Chrome, light	lb.	.30 @	.32
medium	lb.	.35 @	.36
dark	lb.	.36 @	.45
commercial	lb.	.13 @	—

Reds

Antimony, crimson	lb.	.35 @	.42
golden	lb.	.18 @	.27
red sulphuret	lb.	.20 @	.22
Indian, English, pure	lb.	.12 @	.15
Para toner	cwt.	1.00 @	1.10
Toluidine toner	lb.	2.10 @	—
Venetian red	lb.	.03½ @	.06
Vermillion, quicksilver, English	lb.	1.25 @	1.35
domestic	lb.	.25 @	.30

Whites

Albalith	lb.	.06 @	.06½
Aluminum bronze	lb.	.55 @	.60
Azolith	lb.	.06 @	.06½
Lithopone, domestic (factory)	lb.	.06 @	.06½
Zinc oxide. American Horse Head Special	lb.	.07½ @	.08
XX red	lb.	.07 @	.07½
American Azo: ZZZ (lead free)	lb.	.07 @	.07½
ZZ (under 5 per cent leaded)	lb.	.06¼ @	.06⅝
Z (8-10 per cent leaded)		.06 @	.06¼
Zinc oxide, French process, White seal	lb.	.11 @	.11¼
Green seal	lb.	.10 @	.10¼
Red seal	lb.	.09 @	.09¼

Yellows

Chrome, light	lb.	.17 @	—
dark	lb.	.17 @	—
medium	lb.	.17 @	—
Ocher, French	lb.	.02⅝ @	.03½
domestic	lb.	.02½ @	.03

COMPOUNDING INGREDIENTS

Aluminum flake	ton	25.00 @	30.00
hydrate	lb.	.17 @	.18
Ammonia carbonate,	lb.	.09½ @	.10¼
Barium carbonate	ton	75.00 @	80.00
Barium Dust	lb.	.04½ @	—
Barytes, southern off-color,	ton	20.00 @	—
Western, prime white,	ton	23.00 @	—
Basofor	lb.	.04¾ @	—
Blanc fixe, dry, f.o.b. works	lb.	.04¼ @	.04½
Carrara filler	lb.	.01½ @	—
Chalk, precipitated, extra light	lb.	.03½ @	.04¼
heavy	lb.	.02½ @	.03¼
Clay, China, domestic,	ton	15.00 @	16.50
imported	ton	16.25 @	23.25
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	22.00 @	32.00
Fossil flour	ton	60.00 @	—
Glues, extra white	lb.	.30 @	.40
medium white	lb.	.20 @	.28
cabinet	lb.	.18 @	.30
cabinet low grade	lb.	.15 @	.18
common bone	lb.	.08½ @	.14
Graphite flake, bbls.	lb.	.05 @	.08
amorphous	lb.	.04 @	.10
Infusorial earth, powdered	ton	60.00 @	—
bolted	ton	65.00 @	—
Liquid rubber	lb.	.15 @	—
Mica, powdered	lb.	.15 @	—
Rotton Stone (powdered)	lb.	.02½ @	.04½
Silica (gold bond)	ton	31.00 @	—
Soapstone, powdered	ton	12.00 @	15.00
Starch, powdered corn	cwt.	2.70 @	2.75
Talc, domestic	ton	15.00 @	18.00
French	ton	25.00 @	32.50
French, high grade	ton	43.00 @	48.00
Italian	ton	47.00 @	58.00
Terra Alba	cwt.	1.85 @	2.00
Tripoli, white	lb.	.02½ @	—
Whiting, commercial	cwt.	1.00 @	1.10
Quaker	ton	13.00 @	15.00
English cliffstone	cwt.	1.50 @	1.70
gilder's bolted	cwt.	1.10 @	1.25
Paris white American	cwt.	1.25 @	1.35
Wood pulp XXX	ton	32.00 @	—
" " X	ton	25.00 @	—
Zinc Oxide— 5 per cent leaded		.06½ @	.06¾
10 per cent lead sulphate	lb.	.06¼ @	.06½
20 per cent lead sulphate	lb.	.06¼ @	.06½
35 per cent lead sulphate	lb.	.06¼ @	.06½

(Also see whites)

MINERAL RUBBER

Gilsonite	ton	65.00 @	—
Genasco (factory)	ton	60.00 @	—
Hard hydrocarbon	ton	32.00 @	42.00
Soft hydrocarbon	ton	30.00 @	35.00
Pioneer M.R.	ton	42.00 @	44.00
320 M. P. hydrocarbon (c. l. factory)	ton	50.00 @	65.00
300/310 M. P. hydrocarbon (c. l. factory)	ton	40.00 @	90.00
Synpro, granulated, M. R. (factory)	ton	54.00 @	68.00

SOFTENERS

Acids

Acetic, 28 per cent	cwt.	2.92 @	3.65
Cresylic, 97 p. c.	gal.	.60 @	.62
95 p. c.	lb.	.55 @	.57
Muriatic, 20 degrees	cwt.	1.00 @	1.10
Nitric, 36 degrees	cwt.	4.50 @	5.00
Sulphuric, 66 degrees	ton	14.00 @	16.00
60 degrees	ton	8.00 @	10.00
Tartaric, crystals	lb.	.32 @	—

Alkalies

Caustic soda, 76 p.c.	cwt.	3.45 @	3.75
Soda ash, 58 p.c.	cwt.	1.95 @	2.30

Oils

Castor, No. 3, bbls.	lb.	.12 @	—
Corn, crude, bbls.	lb.	.09⅜ @	—
refined	lb.	.10¾ @	—
Chinawood, bbls.	lb.	.12¾ @	.13
Cottonseed,	lb.	.10¼ @	.10¾
Glycerine, drums	lb.	.18½ @	.19
Linseed, domestic	gal.	.87 @	.90
imported	gal.	.86 @	—
Palm, Niger		.07 @	.07
Lagos	lb.	.07⅛ @	.07⅜
Peanut, domestic, crude	lb.	.11 @	.12
Petrolatum, amber	lb.	.04½ @	.04¾
dark amber	lb.	.03⅝ @	.03⅞
Pine, steam distilled	gal.	.80 @	.85
Rapeseed, refined	gal.	.78 @	.81
blown	gal.	.92 @	.95
Rosin, first rectified	gal.	.45 @	—
second rectified	gal.	.47 @	—
Tar, commercial	gal.	.31½ @	—
Soya Bean		.11½ @	—
Petrolatum, standard	lb.	.05 @	.08

Resins and Pitches

Cumar resin, hard	lb.	.09 @	.10
soft	lb.	.09 @	.10
Tar Retort	bbl.	11.00 @	—
kiln burned	bbl.	12.50 @	—
Pitch, Burgundy	lb.	.04½ @	.06
coal tar	ton	.01½ @	—
pine tar		.03½ @	—
Rosin, grade K	bbl.	6.75 @	—
Shellac, fine orange	lb.	.90 @	—

Solvents

Acetone, drums	lb.	.20 @	.23
Alcohol, denatured, No. 1 bbls.	gal.	.34 @	.38
Benzol, 90 per cent	gal.	.27 @	.32
pure	gal.	.30 @	.35
Carbon bisulphide,	lb.	.06¾ @	.07½
tetrachloride	lb.	.09½ @	.10⅛
Dimethylaniline	lb.	.36 @	.38
Motor gasoline, steel bbls.	gal.	.24 @	—
Naptha, V. M. & P.	gal.	.23 @	—
Toluol, pure	gal.	.30 @	.35
Turpentine, spirits	gal.	1.57 @	—
wood	gal.	1.48 @	—

Waxes

Beeswax	lb.	.40 @	—
Carnauba, No. 1	lb.	.20 @	—
Ceresin, white	lb.	.09 @	.10
Bayberry	lb.	.20 @	.24
Montan, crude	lb.	.03¼ @	.03¾
Ozokerite, black	lb.	.20 @	.21
green	lb.	.25 @	.26
Paraffine	lb.	.02¾ @	.04
Sweet wax	lb.	.12 @	—

SUBSTITUTES

Black	lb.	.07 @	.14
White	lb.	.08 @	.16
Brown	lb.	.10 @	.15
Brown factice	lb.	.07 @	.15
White factice	lb.	.08½ @	.15

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.28 @	.30
Sulphur chloride (jugs)	lb.	.13½ @	.15
" (drums)	lb.	.08 @	.10
Sulphur flour (bbls.)	cwt.	2.55 @	3.10
(bags)	cwt.	2.30 @	2.70
100 per cent pure (superfine)	cwt.	2.60 @	3.00
Sulphur, 100 per cent pure, Bergenport brand (bags)	cwt.	2.30 @	2.60
(bbls.)	cwt.	2.55 @	2.90

Caustic Soda—There was a fairly good contract demand and inquiries were in the market further in advance than many producers cared to quote. Leading dealers offered standard brands at 3.75 ex store.

Soda Ash—The market was very active with the demand continuing in full volume and producers operating at capacity. There was no change in quotations and light, basis 58 per cent, in bags brought $1.75 to $2.10 per 100 pounds and barrels, $1.95 to $2.30.

Zinc Oxide—The demand continued good without any particular change in the situation. Prices remained unchanged as follows: French process, red seal, barrels car lots, 9 cents; less than car lots, 9¼ cents; green seal, barrels car lots, 10 cents; less than car lots, 10¼ cents; white seal barrels car lots, 11 cents; less than car lots, 11¼ cents. American process, lead free, barrels, car lots, 7½ cents, less than car lots, 8 cents.

Lithopone—All through the season the demand has been exceptionally good and promises to continue so for the rest of the year. Very little has been done in imported since the new tariff law went into effect. Prices follow: Bags, car lots, 6 to 6¼ cents; barrels, car lots, 6 to 6½ cents; barrels, less than car lots, 6¼ to 6¾ cents.

Litharge—The market has been quiet since the advance in prices. Quotations follow: Casks, 9.65 cents; kegs less than 500 pounds, 13.25 cents; 500 to 2000 pounds, 11.92 cents; 2,000 to 10,000 pounds, 11.44 cents.

Blanc Fixe—There was a fair demand and prices remained unchanged. Dry was quoted at 4¼ to 4½ cents a pound and pulp at $40 to $50 a ton.

Barytes—There has been considerable delay in shipments on account of the embargo and the car shortage. Business continues heavy for this season of the year. Prime Western barytes continues at $23 a ton f.o.b. point of production, package included.

Orange Mineral—The advance in the prices of domestic has not shown any marked change in the demand for imported material. During the period the market has been quiet. Quotations follow: Domestic, 13.13 cents to 14¼ cents per pound; English, 13¾ cents; German, 14 cents; French, 15 cents.

Whiting—Prices held steady and the demand was well up to the season. Commercial remains the same at $1.00 per hundred pounds; gilders' bolted, $1.10; American paris white, $1.25; English cliffstone, $1.50.

Talc—The demand for both domestic and imported material was good and prices held steady. Domestic was quoted at $15 to $18 per ton; French, $25 to $32.50; high grade French, $43 to $48; Italian, $47 to $58.

Palm Oil—The market was quiet. Lagos ranged from 7⅛ cents to 7.35 cents per pound; Niger was reported as low as 7 cents per pound for small lots.

Soya Bean—Offerings were light but the market was firm. Sales of crude were reported in barrels, car lots at 10⅛ cents per pound and 10½ cents for smaller quantities.

Dimethylaniline—The increase in the cost of raw materials caused an advance in the price of this material and makers quoted 36 to 38 cents per pound.

Aniline Oil—There was no change in prices but a strong tone characterized the market with producers quoting 16 to 16½ cents per pound at works.

Crude Rubber

NEW YORK, Nov. 18, 1922

THE advance in crude rubber prices which set in immediately after the announcement of the adoption of the Stevenson restriction-of-production plan by the British government a month ago continues with practically no reaction. The local market has ruled firm to strong for the past ten days, rising 1¼ cents in sympathy with the even greater rise in the London market. Spot rubber (ribbed smoked sheet and first latex) is now 24⅛ cents, with January/March at 24⅝ and April/May/June at 25. It is practically certain that spot rubber will reach or exceed 25 cents this coming week, and in view of the announced British intention to stabilize the market price around 15 pence, we may well look for 28 or even 30 cent rubber within the next few weeks.

The market has readily absorbed all of the profit taking on the part of those who have held stocks of rubber for months and are now letting go of it at the higher level. Warehouse stocks are being reduced as a result of this movement. The factories are still holding off from purchases to some extent, hoping for a price recession, but the tendency is decidedly upward, not downward.

The attitude on the part of the Rubber Association in this country and the India Rubber Manufacturers in Great Britain, which appears to be more or less opposed to the restriction plan, cannot affect the operation of the scheme or the course of crude rubber prices, in the opinion of the best informed rubber men on both sides of the Atlantic. The general feeling is that the members of both organizations had ample warning for months that the British government would act in this matter, which is political as well as economic, and that it is too late now to make any changes in the general plan of stabilizing prices and improving plantation conditions.

Quotations as of this date are practically as follows:

Plantations			
Ribbed Smoked Sheets	.24	@	.24⅛
First Latex, spot	.24	@	.24⅛
December	.24⅛	@	.24¼
January/March	.24⅛	@	.24⅝
April, May, June	.24⅝	@	.25
July/December	.25⅝	@	.26
Amber Crepe No. 1, spot	.23⅝	@	—
Amber Crepe No. 2, spot	.23½	@	—
Amber Crepe No. 3, spot	.23	@	—
Light Clean Thin Brown Crepe	.23¼	@	.23½
Commercially Clean Thin Brown Crepe	.22⅝	@	.23
Specky Brown Crepe	.22	@	.22½
Roll Brown Crepe, spot	.22¼	@	.22½
Paras			
Madeira Fine	.25	@	.25½
Acre Fine	.24⅝	@	.25
Up-river Fine	.23⅝	@	.24
Up-river Medium	.21	@	.21½
Up-river Caucho Ball (shipment)	.18¼	@	.18½
Up-river Coarse	.17¼	@	.17½
Islands Fine	.20	@	.20½
Islands Medium	.19¼	@	.19½
Islands Coarse	.12	@	.12¼
Cameta	.12¾	@	.13
Xingu Ball	.16½	@	.17
Tapajos Fine	.21½	@	.22
Pontianac			
Prime Pressed	.14	@	—
Plantation	.07	@	—
Bangermassin	.08	@	—
Siak Gutta Percha	.17½	@	—
Prime Macassar	2.75	@	—
Balata			
Panama Block	.40	@	—
Surinam Sheets	.68	@	—
Columbia Block	.48	@	—
Venezuela Block	.60	@	—

Reclaimed Rubber

NEW YORK, Nov. 18, 1922

This market is apparently getting into its stride, now that crude rubber is nearing the 25-cent level, and the greatest interest and activity that have been shown in months are now in evidence. All of the plants are busy working on various grades of reclaims, and the demand for products is considered satisfactory. Prices remain firm, and there has been a slight increase in quotations on floating and friction grades.

Quotations of this date are nominally as follows:

Standard Reclaims			
Floating	.13¼	@	.14
Friction	.13½	@	.14
Boots and Shoes	.10½	@	.11
Boots and Shoes (washed)	.13¼	@	.13¾
Mechanical	.08	@	.10
Hose	.10	@	.11
Tires, truck	.09	@	.10
Tires, auto	.09½	@	.10
White	.12	@	.13

Scrap Rubber

NEW YORK, Nov. 18, 1922

The market is decidedly firmer than at the time of our last report two weeks ago and the price movement has a strong upward trend. Dealers are covering their short commitments and the mills are coming into the market in greater volume. The interlocking of interests in the rubber trade creates automatically a greater demand from the reclaimed plants for scrap as crude rubber prices rise. The greatest advances took place in mixed auto which rose to $12 a ton and inner tubes No. 1 which advanced about 1 cent, to 4 cents. Other inner tube grades rose in proportion.

Quotations of this date are as follows:

Auto tire peelings	.01	@	—
Standard White auto ....ton	20.00	@	—
Mixed auto .....ton	10.00	@	12.00
Bicycle tires	.00½	@	.00⅝
Clean solid truck tires	.01	@	.01¼
Boots and shoes	.03⅛	@	.03⅜
Arctics, trimmed	.02¼	@	.02¾
Arctics, untrimmed	.01½	@	.01¾
Inner tubes, No. 1	.03¾	@	.04
Inner tubes, compounded	.03	@	.03¼
Inner tubes, red	.02⅞	@	.03⅛
Battery jars, clean hard rubber	.00¾	@	.01
Heels and pads	Nominal		
Black mixed	Nominal		
Garden Hose	.00⅜	@	.00½
Air brake hose	.00½	@	.00⅝
Red packing	.00½	@	.00⅝
White mixed rubber	.00½	@	.00¾
White druggist sundries	.01	@	.01¼

American Rubber Patents

1,430,699 Herbert R. Stratford, Cleveland, Ohio, assignor, by mesne assignments to Paramount Rubbber Consolidated, Inc., Philadelphia, Pa., a corporation of Delaware. Method of and Apparatus for Making Hollow Rubber Articles.

1,430,677 Yosaku Ose, Tokyo, Japan. Method of Manufacturing Rubber Shoes.

1,431,069 Jarrett M. Ward, Jarrettsville, Md. Puncture proof Tire.

1,431,055 James F. Stranahan, Pittsburgh, Calif., assignor of one-half to John F. Mara, Pittsburgh, Calif. Resilient Tire.

1,430,795 David John Chappell, Llanelly, Wales. Air Tube for Pneumatic Tires.

1,431,471 John Lehr, Akron, Ohio, assignor to The Miller Rubber Co., Akron, Ohio. Process for Making Rubber Acid-Proof Containers.

1,431,345 George Velting, Sr., and George Velting, Jr., Scarsdale, New York. Tire.

1,431,323 John Muszynski, Collinsville, Conn. Bicycle Tire.

1,431,540 Robert Osgood, Torquay, England. Pneumatic Tire.

1,431,785 Elias J. Emery, Lynn, Mass. Vehicle Tire.

1,431,403 William Kearns and Henry P. Connelly, Detroit, Mich., assignors to Morgan & Wright, a Corporation of Michigan. Apparatus for Refinishing Blemished Tire.

1,431,596 Henry L. Pixley, Cleveland, Ohio. Inner Tube for Tires.

1,431,366 Robert Brushwiler and Albert Otto, Detroit, Mich., assignors to Morgan & Wright, a Corporation of Michigan. Machine for Mounting Tires on Sealing Rings.

1,432,398 William T. King and Wayne W. King, Alliance, Ohio. Emergency Automobile Tire.

1,432,469 Peter J. Klein and Edward Kenny, Naugatuck, Conn. Press and Process for Vulcanizing Rubber Shoes.

1,432,392 Roscoe S. Heise, Middletown, Ohio, assignor to Miami Cycle & Mfg. Co., Middletown, Ohio. Pedal Rubber.

1,432,311 Harry William Van Meeteren, Birmingham, England, assignor of one-third to Amos Edwards, and one-third to Henry Headley, both of Birmingham, England. Method of and Means for Assembling a Pneumatic or Elastic Tire in Relation to a Rim or Wheel.

1,432,483 Andre Jules Michelin, Paris, France. Pneumatic Tire.

1,432,094 John C. Yager, Alexandria, Minn. Resilient Tire.

1,432,158 Carl D'Aiuto, Cleveland, Ohio. Resilient Vehicle Tire.

1,432,097 James A. Belcher, Tacoma, Wash. Emergency tire shoe.

1,432,004 George H. Wheatley, Chicago, Ill. Method of and Apparatus for Making Resilient Tires.

1,434,892 Marion M. Harrison and Harold A. Morton, Akron, Ohio, assignors to The Miller Rubber Co., Akron, Ohio. Process of Manufacturing Vulcanized-Rubber Articles.

1,434,808 Arthur A. Burnett and Vernon L. Darrow, Racine, Wis. Rubber Knee Pad.

1,434,909 Harold A. Morton, Akron, Ohio. Rubber Vulcanization and Product Thereof.

1,434,908 Harold A. Morton and Marion M. Harrison, Akron, Ohio, assignors to The Miller Rubber Co., Akron, Ohio. Process of Vulcanizing Rubber.

1,434,567 Clyde L. Smith and Emmett S. Webster, South Bend, Ind., assignors by mesne assignments, to Smith One Heat System, South Bend, Ind. Collapsible Tire Core.

1,434,764 George Altstadter, Vienna, Austria. Tire-Healing Composition.

1,434,661 Herman Lobel, Los Angeles, Calif., assignor to Albert H. Honey, Los Angeles, Calif. Pneumatic Tire.

1,434,719 Sylvester R. Murphy, Omaha, Neb. Resilient Tire.

1,434,577 George B. Wood, Detroit, Mich. Tire-Tube-Repairing Kit.

1,434,452 Richard J. Riendeau, Aldenville, Mass., assignor to The Fisk Rubber Corp., Chicopee Falls, Mass. Tube Deflation.

1,435,091 William C. Stevens, Summit County, Ohio, assignor to The Firestone Tire & Rubber Co., Akron, Ohio. Tube-Wrapping Machine.

1,433,093 Iwan Ostromislensky, Riga, Russia, assignor, by mesne assignments, to New York Belting and Packing Co., a Corporation of New York. Process for Vulcanizing Rubber and Products Obtained thereby.

1,433,099 Reed P. Rose, New York, N. Y., assignor to Morgan & Wright, a Corporation of Michigan. Process of Compounding and Vulcanizing Rubber and Products Thereof.

1,432,895 Hermann Plauson, Hamburg, Germany. Reclaiming Rubber.

Trade Marks Applied For

[The following are trade-mark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Marks Company, Barrister Building, Washington, D. C. or Bush Building, 130 West 42 Street, New York, trade-mark specialists. As an additional service feature to its readers this Journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering.]

CAHILL'S ARCH BRACE and picture of brace on a foot within a circle. No. 159,742. The Cahill Shoe Company, Cincinnati, O. For men's, women's and children's boots, shoes, and slippers of leather, rubber, felt, cloth, silk, and fabric construction.

RED FOX with picture of head of Indian in center. No. 143,628. United States Tire Company, N. Y. C. For tubes.

PATSY SANDAL—No. 162,244. Craddock Terry Company, Lynchburg, Va. For women's and children's shoes of leather or a combination of leather, rubber or fabric.

BUDDIES—No. 160,660. John E. Cable, doing business as Edison Rubber Co., Akron, O. For slabs and sheets to rubber composition material, particularly for use in forming shoe soles.

THE TIMBRO—No. 155,938. Timson Bros. Inc., Boston, Mass. For shoes made of leather, rubber, and combinations of same.

BLUE BEAR—No. 160,159. W. W. Smith Shoe Company, Boston, Mass. For boots and shoes of leather, rubber, or fabric.

PICTURE OF BEAR in blue. No. 160,158. W. W. Smith Shoe Company, Boston, Mass. For boots and shoes of leather, rubber, or fabric.

LIGHTNING GRIP—No. 155,563. Hugh Kerans, St. Louis, Mo. For rubber patches for inner tubes.

SWIFT—No. 157,886. Chicago City Rubber Works, Chicago, Ill. For rubber automobile tires.

RANGER—No. 157,885. Chicago City Rubber Works, Chicago, Ill. For rubber automobile tires.

TEDESON—No. 157,884. Chicago City Rubber Works, Chicago, Ill. For rubber automobile tires.

MERRIT RUBBER CO., INC. above oval. No. 149,594. Merritt Rubber Co., Inc., N. Y. C. For rubber vehicle tires and rubber inner tubes.

DELROK—No. 166,406. John Thomas Read, Northampton, England. For boots and shoes.

PLAYFELLOW—No. 165,955. J. P. Hartray Shoe Co., Chicago, Ill. For shoes made wholly or in part of leather.

NU-LIFE—No. 165,954. Hanover Rubber Co., West Hanover, Mass. For rubber heels, soles, and half soles.

NEWRADIO—No. 165,090. Antonio Scodes, Long Island City, N. Y. For rubber heels.

NUSTEP—No. 164,871. Dryden Rubber Company, Chicago, Ill. For rubber soles and rubber heels.

K-F—No. 166,004. The K-F Heel Company, Newark, Ohio. For rubber heels.

UNITED below picture of two clasped hands within a frame. No. 153,746. Taunton Rubber Co., Inc., Taunton, Mass. For rubber heels.

PERFECTION—No. 160,616. Livezey Supply Co., Newark, N. J. For rubber gloves and tubing.

B L T in center of black oval and words "Preserves Life of Rubber on rim..No. 161,701. Rubber Process Corporation, Detroit, Mich. For preservative compound for treating rubber and manufactured rubber.

HEAD of a lion within double circle. No. 126,826. The Standard Tire Company, Willoughby, Ohio. For rubber vehicle tires.

CANNYGRIP—No. 161,173. Commonwealth Shoe and Leather Company, Boston, Mass. For shoe soles comprising inner and outer soles of leather and middle sole of rubber, with parts of the rubber projecting through the leather of the outer sole, and shoes with uppers of leather and fabric and of combinations of leather and fabric equipped with such soles as aforesaid.

BABE RUTH below portrait of Babe Ruth and word Victor within diamond. No. 157,522. Hirschberg & Co., N. Y. C. For men's, boys' and childrens caps of cloth, leather, rubber and combinations thereof.

VALOR—No. 152,604. The Ashland Tire and Rubber Company, Ashland, Ohio. For rubber fabric or rubber and fabric automobile tire casings and inner tubes.

EASY FOOT—No. 157,730. Thomas G. Plant Company, Boston, Mass. For boots, shoes, and slippers of leather, rubber, felt, silk, cloth, or other fabric construction.

GIANT GRIP—No. 159,759. Lionel F. Lee, doing business as Lee Rubber Company, Waukesha, Wis. For Inner-Tire Rubber Patches.

New Incorporations

ALABAMA

The Standard Tire Co., to deal in tires. $12,000. Incorporators: C. H. Denton, president and general manager; J. H. McEvoy, vice president and Owen E. McEvoy, secretary and treasurer. Principal office, Mobile, Alabama.

DELAWARE

The National Tire Rebuilding Co. $30,000. Agent, Corporation Trust Co. of America, Wilmington, Delaware. Principal office, Wilmington, Delaware.

Carliale Tire Stores, to deal in automobile tires. $10,000. Incorporators: Joseph M. Gilbert, Wesley M. Messersmith and Thomas McErlean—New York City. Agent, Corporation Trust Company of America, Wilmington, Delaware.

INDIANA

Sullivan-Shaw Tire Company, to deal in tires. $25,000. Incorporators: Robert E. Sullivan, E. John Shaw and Daniel D. Schurtz. Principal office, South Bend, Indiana.

Yale Tire and Rubber Co., to manufacture and sell tires and tubes. $30,000. Agent, M. E. Majors, Indianapolis, Indiana (A Connecticut corporation, qualified in Indiana.)

Mid-States Rubber Company, to manufacture rubber products. $100,000. Incorporators: John S. Hopkins, George A. Cunningham, Marie C. Hopkins and Marion S. Cunningham.

NEW JERSEY

Semple Manufacturing Co., to manufacture rubber tires and other rubber products. $100,000. Principal office, Trenton, New Jersey. Incorporators: Charles H. Semple, Fordley, Pennsylvania; Geo. T. Nutt, Asbury Park; Lulu Matthews, Trenton, New Jersey.

Hatfield Rubber Works, Inc., to manufacture molded rubber goods. $250,000. Principal office 92 Academy street, Newark, New Jersey. Incorporators: Andrew L. Hatfield, Hillside, New Jersey; Louis Beller, Abraham Beller, Newark, New Jersey.

American Tire and Supply Co., to deal in tires, tubes, etc. 250,000. Incorporators: Alexander Brooklyn, Passaic, New Jersey; Clarence L. Edwards, Paterson, New Jersey; Alice Brooklyn, Passaic, New Jersey. Principal office, 323 Market street, Paterson, New Jersey.

NEW YORK

A. H. Goodman Co., to manufacture hose and rubbers. $10,000. Incorporators: A. H. Goodman, B. Goodman and Leo Hoffman. Attorney, J. F. Nathan, 305 Broadway, New York City. Principal office, Brooklyn, New York.

Charles E. Wood, to buy and sell crude rubber. $20,000. Incorporators: C. E. Wood, J. R. Wood and H. Zeitian. Attorney, H. Silverman, 209 Broadway, New York City.

Snap-On-Heel Corporation, to manufacture rubber heels. $300,000. Incorporators: G. M. Schrade, 282 Kossuth street, Bridgeport, Connecticut; A. V. Schrade, 290 West Broadway, New York City; A. F. Garbe, 482 Fourth street, Brooklyn, New York City.

Universal Truck Tire Company, Inc., to manufacture tires. $25,000. Incorporators: B. G. Ekelun, D. E. Alvord and M. K. Brewster—Syracuse, New York. Principal office, Syracuse, New York.

OHIO

Diamond Rubber Co. $200,000. Incorporators: H. E. Raymond, Frank C. Van Cleef, Norman E. Oliver. Idaho agent, Herman Castle, 1115 Main street, Boise.

PENNSYLVANIA

Horn Surgical Co., to manufacture elastic hosiery etc. $100,000. W. H. Horn, Jr., president; Upper Darby, Philadelphia; W. B. Christy, Germantown, Philadelphia; K. G. Frisby, secretary, 7 West Coulter street, Philadelphia—Pennsylvania.

WASHINGTON

Faultless Pneumatic Tire Co., to deal in tires and accessories. $2,000,000. Incorporators: C. H. Hesseltine and W. A. Calder. Principal office, Seattle, Washington.

WEST VIRGINIA

Trojana Rubber Heel Co., to manufacture and sell rubber heels. $100,000. Principal office, Charlestown, West Virginia.